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SUBSISTENCE, SEASONALITY, AND GENDER: PROCESSUAL AND POST-PROCESSUAL APPROACHES TO FIVE ARCHAEOLOGICAL SITES IN THE NORTHWEST TERRITORIES, CANADA

By

Lynita S. Langley ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements of the degree of Master of Arts

DEPARTMENT OF ANTHROPOLOGY

EDMONTON, ALBERTA
SPRING, 1994

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Processual and Postprocessual Approaches to Five Archaeological Sites in the Northwest Territories, Canada submitted by Lynita S. Langley in partial fulfillment of the requirements for the degree of Master of Arts in Anthropology.

Clifford G. Hickey, Supervisor

Raymond. E. LeBlanc

L. Dennis Gignac

April 20, 1994

Abstract

Two primary orientations to archaeological analysis-processual and post-processual- are presented in an attempt to draw general conclusions regarding subsistence patterns, treatment of animal carcasses during processing, and gender roles among peoples of the western Canadian Arctic through time. Processual methodologies center on the use of quantitative evaluation of faunal remains in an effort to determine the types of activities carried out at archaeological sites within a framework of cultural adaptations to the environment. Utility indices derived for caribou (Rangifer tarandus) were applied to the caribou assemblages to discern the use of caribou for subsistence. Post-processual analyses, in general emphasizing cultual values and "meanings", involve the application of models of gender roles drawn from the ethnographic record. It is suggested that two types of decision-making processes-primary, or male, and secondary, or female-play significant roles in the formation of the faunal archaeological record. Primary decisions determine elements to be introduced into sites, an additive process. Secondary decisions determine elements for removal from assemblages, a subtractive process, through marrow and grease processing activities. Both processes must be considered in order to understand the general appearance of the faunal record.

Traditional approaches to determining seasonality of site occupation are utilized, supplemented by an exploratory technique of observing frequency of caribou scapulae relative to the entire assemblage. It is suggested that relative frequencies of scapula present in sites may serve as reliable indicators of seasonal occupation.

A reconstruction of the seasonal round of Thule/Mackenzie Inuit peoples for the Darnley Bay/Bluenose Lake region of west-central Canada is proposed based upon ethnographic analogies to the Copper Inuit, the historic occupants of the region. It is suggested that in an area of restricted resources subsistence strategies remained virtually unchanged through time from the Thule/Mackenzie Inuit to the Copper Inuit. It is also suggested that gender roles varied little during this time.

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Chapter 1. Introduction

The objective of this study is to examine questions relating to the lifeways of the prehistoric people of the southern Beaufort Sea coast and Bluenose Lake region in the Northwest Territories, Canada. This will be done through observations of patterns within faunal assemblages from a group of archaeological sites located near Bluenose Lake, utilizing various methods.

As is the case of many archaeological sites, those from Bluenose Lake contained large quantities of faunal material. They also, unfortunately, contained relatively few artifactual remains. Therefore, the faunal assemblages take on added importance in that they will be treated as the major "cultural" products in this study. They will be asked to contribute more than simple quantitative lists of species and elements present.

This thesis shall examine the faunal assemblages from two opposing perspectives, Processualist and Post-Processualist. The Processualist approach will apply an existing methodology which was devised by Binford (1978). This method has been adapted and utilized by other archaeologists for example, (Will 1985; Woollett 1991; Lyman 1985; Lyman et al 1992) prior to this study. The approach attempts to quantify the existing data and derive deductive conclusions from the results. The Post-Processualist approach will focus mainly upon the aspect of gender and its potential contribution to the formation of the faunal assemblages examined in this study. This approach will attempt to incorporate the existing ethnographic data concerning gender roles in hunter-gatherer societies in order to draw further conclusions regarding the faunal material being examined.

The remainder of this chapter provides an introduction to the history of zooarchaeology, and the various applications of zooarchaeological research. Further, the Processualist and Post-Processualist approaches are also discussed, with regards to their origins and applications.

Chapter 2 presents a review of ethnographic materials concerning gender roles in several types of societies. It discusses the aspect of gender as a formation process in the archaeological record, and recent applications of gender oriented research to the archaeological record. Women's roles in societies are examined regarding procurement of foods, food processing and the sexual division of labour, food distribution, and the preparation and consumption of food.

Chapter 3 offers a review of previous archaeological and ethnographical research within the study area from the period of European contact (circa 1771), until the present time. This chapter attempts to familiarize the reader with the succession of major contributions both in the areas of archaeology and ethnography, as well as the commonly-held theories regarding early settlement and population migrations in the western and central Canadian arctic.

Chapter 4 provides a description of the archaeological sites examined in this study. Data on the faunal material is presented. Chapter 4 also attempts to construct a cultural interpretation of the data. Conclusions derived by Stevenson (1992) are presented.

Chapter 5 presents a quantitative analysis and conclusions of the material. Utility indices derived by Binford for meat, marrow and grease values are applied to the caribou skeletal elements and analyzed ainan attempt to determine the activities conducted at the sites. Alternative conclusions regarding the seasonality of occupations and activities at the sites are offered based upon a closer examination of the data by this study. The Processual and Postprocessual approaches are discussed with regards to their application and their overall usefulness in the examination of this body of data. Suggestions for further research which might prove useful in analysis are offered in conclusion.

Chapter 6 offers conclusions drawn from the various types of analysis performed in an effort to incorporate the zooarchaeological analysis with the existing body of knowledge concerning these sites. I attempt to reconstruct the seasonal migrations and lifestyles of the peoples who inhabited these sites, as well as provide an estimate as to the possibility of gender roles changing over time.

Previous archaeological analytical techniques have often concentrated on very limited sets of variables which are considered to affect the archaeological faunal record. Zooarchaeologists frequently regard animal remains present in the archaeological record from a purely functionalist perspective. They generally follow two basic assumptions: (a) animals present were used primarily as food sources (especially meat); and (b) the people utilizing these carcasses did so with maximum efficiency. We now know that these assumptions are only partially true, as illustrated by Binford's research among the Nunamiut (1978). Moreover, the functionalist approach to resource utilization is convenient in that formalist economics readily incorporates optimization or "mini-max"/maximization models and rationales, and data that are quantifiable (Plattner 1989, Woollett 1991).

While the functionalist approach may be a useful tool, it reasserts the idea that the process of hunting and butchering are individual activities, rather than being carried out within variable cultural contexts. This perspective therefore neglects the consideration of beliefs, customs, and social relationships which bind a group of individuals into a cohesive unit (Woollett 1991:1).

The economic and nutritional needs of people condition the utilization of a carcass. However, types of butchery, methods of preservation, and distribution of the raw material are culturally-based activities that will influence the construction of the archaeological record. For example, Woollett (1991:1) suggests that the archaeological record may possess a "property of cultural distinctiveness", which results from various "styles" of butchery, possibly indicative of non-economic cultural preferences that may influence the formation of faunal assemblages. Such a property, and its role in the formation of the archaeological record, warrants closer examination. Recognition of cultural distinctiveness by archaeologists, coupled with intensive analysis of faunal data, may provide a means to strengthen current hypotheses and theories. These analyses may also prove useful in the application of faunal data to new archaeological challenges as they arise (Yellen 1977). The faunal analyses conducted in this thesis will test Woollett's hypotheses regarding cultural distinctiveness in the archaeological record, and try to determine whether or not it is a useful tool in the present case.

Zooarchaeology - Its Method and Theory

Zooarchaeology's beginnings date to the earliest years of archaeology. From its first uses as a tool for identifying the antiquity of humankind to the present day, when it has become a sub-discipline in its own right, zooarchaeology has made significant contributions to the field of archaeological research. In 1797 John Frere attempted to date the antiquity of human occupation in Europe by describing Acheulian handaxes that were found in association with remains of unidentified animal species (Frere in Trigger 1989:87-89). Edouard Lartet's research in the Dordogne during the 1860s led him to conclude that the paleolithic was a "series of phases that could be distinguished according to artifacts and associated prehistoric animals" (Trigger 1989:85).

There has been a long history of the use of faunal remains from archaeological sites to establish relative dates and thus determine the antiquity of humanity. However, most research in the discipline of zooarchaeology has been of a quantitative nature-determining species and numbers of skeletal elements for each species represented in a faunal assemblage.

One of the earliest scientific studies of faunal assemblages in order to determine how they originated was conducted by a group of Danish scientists as early as the 1850s. These men conducted experiments by feeding animal bones to dogs in an effort to explain a disproportionate ratio of diaphyses of long bones of birds over other skeletal elements (Trigger 1989:127).

Not until the pioneering work of the paleontologist T. E. White, however, would we observe truly systematic analysis of entire faunal assemblages that would play a significant role in archaeological analysis. During the 1950s and 1960s, White's work was on the cutting edge of scientific research. He published papers describing faunal assemblages from various types of archaeological sites in the American Southwest. White stressed the use of the Minimum Number of Individuals (MNI) method for quantifying faunal assemblages (White 1952; 1953a, b), and attempted to determine the amounts of usable meat yielded by various species (White 1954; Grayson 1984).

White's approach, while advancing archaeological interests of the time, should be viewed as following functionalist principles. It omitted uses of a carcass other than as a source of meat, (e.g., disregarding any need to obtain skin, hair, bone, antler, marrow). The techniques used by White were by no means new; they had been in use by vertebrate paleontologists as early as the 1920s and 1930s. It was White's work, however, that popularized the methods in North American archaeology and established them as standard tools for analysis (Grayson 1984; Woollett 1991).

Zooarchaeological research, to this point in history, was generally conducted by zoologists on unsystematically collected assemblages of bone; and it was often restricted to identifying species of animals present. Thorough bone counts were only irregularly obtained and reported. Oftentimes archaeologists did not collect faunal materials from excavations, and only briefly mentioned their presence in field notes (see Jochelson 1925; Hrdlic^ka 1945).

Early zooarchaeological analysis, despite its humble origins, should not be considered a deficient research tool. It served to answer the more frequently asked questions of the time period in which it was developed. However, as archaeological perspectives and questions changed, especially toward a more quantitative and scientific approach, zooarchaeologists needed to develop new methods of employing quantitative strategies that defined and characterized assemblages (Woollett 1991:2). While more refined, the principal question asked of faunal assemblages remains: in the formation of the archaeological record, which causal factors are most significant?

Variability in the Archaeological Record

Early zooarchaeological models were based on the assumption that all animal remains recovered from archaeological sites (and the modifications of these remains) were solely the product of human activities (Binford 1981:6-8). This assumption resulted in misinterpretation of some important faunal assemblages.

Raymond Dart's research, leading to definition of his famous "osteodontokeratic culture", is such an example. Dart based his formulation of this prelithic "culture" on two assumptions: (a) that different skeletal elements would preserve with similar probabilities-unless there was human interference; and (b) spiral bone fracture patterns examined in the Makapansgat assemblage were the result of hominid activity (Dart 1957; Brain 1981). Dart's conclusions, while plausible, were not based upon any empirical knowledge of bone modification by any specific agents; and they were supported only by a scanty knowledge of hominid butchering techniques.

More recently, Brain (1981) has undertaken a more detailed examination of Dart's material. With a broader base of knowledge of bone attrition owing to weathering and carnivore action, as well as detailed descriptions of butchering and dismemberment techniques of humans, Brain has attributed much of the modification evident on the Makapansgat collection to the activities of hyenas (Brain 1981). Until recently, it has been very difficult to test Dart's hypothesis, owing to a lack of actualistic studies of the effects of butchery practices as well as of geological and other natural attritional processes on bone. Brain has made contributions with his studies of bone attrition and carcass processing among modern peoples (Brain, 1967, 1981).

Other actualistic studies have been undertaken in a variety of other subjects in an effort to lay a groundwork of specific analogies, or middle range theory, for use in assessing patterns observed in the archaeological record. Walker and Long (1977), for example, performed experiments on metapodials from cattle using various cutting implements. These experiments were designed to determine the relationships between edge characteristics of a series of tools and the marks they produced when applied in various ways to bone. More recently, Marean and Spencer (1991) conducted experiments using captive hyenas and a controlled assemblage of bovid bones in order to observe effects of carnivore action on a faunal assemblage.

The development and application of techniques such as those previously described aid archaeologists in their efforts to discern human and non-human agents responsible for the generation of the archaeological record. It must be recognized that, while humans are an active agent in the production of bone assemblages, there are also other influential factors at work (Woollett 1991:3).

Ethnoarchaeology

Other attempts to generate modern analogies from contemporary human behavior to account for variability in the archaeological record have been made. Ethnoarchaeological studies involve detailed observations of carcass butchery techniques, and the distribution and consumption of the parts among contemporary peoples (usually hunter-gatherers).

Examples of such studies include Zierhut's research (1967) among the Calling Lake Cree. His work provides a detailed description of bone-breaking procedures, and is useful in attempting to reconstruct similar behaviors that may have produced faunal assemblages in the archaeological record. Gould (1967) observed butchering and meat sharing among the Ngatatjara in Western Australia. His work gives insight into the ways in which cultural practices influence the formation of the archaeological record. Woollett (1991) has attempted a cross-cultural comparison of bone breaking patterns. From this work he argues that cultural distinctiveness is a property that may possibly be determined by analysis of faunal assemblages in the archaeological record. The present work draws upon many of his ideas and conclusions.

There tend to be two major opinions concerning the methods to be used when conducting ethnoarchaeological research. Some (Brain 1967; Gould 1967; Zierhut 1967; Bonnichsen 1973; Yellen 1977; Jarvenpa and Brumbach 1983) advocate pursuing a directly empiricist approach, compiling ethnographic reports of activities observed and the resulting archaeological remains of those activities. Others (Binford 1978) prefer to carry observations a step further and offer generalizations about variables influencing decision-making and processes of adaptation. This section will first review the empiricist view, followed by discussions of other approaches.

Particularistic Studies

In recent years archaeologists playing the role of ethnographers have attempted to collect ethnographic examples of butchering, dismemberment, carcass processing, and consumption activities in an effort to fill gaps in the existing ethnographic record. These gaps exist because ethnographers tend to disregard the highly specific activities of food processing that are the proximate causes of the archaeological record. Owing to this disregard of details of carcass utilization, traditional ethnographies often lack specific and useful analogies, and are of little use to archaeologists (for example, see Jochelson 1925).

Particularistic ethnoarchaeological studies are primarily focused upon documenting the relationship between deliberate human activities and their resulting archaeological remains. As such, they are useful in constructing highly specific analogies to help explain certain characteristics of the archaeological record. However, particularistic studies, when applied to the archaeological record, are "subject to traditional limitations of analogies" (Woollett 1991:4).

Processual Ethnoarchaeology

Processual archaeologists (such as Binford 1978), employ another strategy altogether. They too, seek the relationship between human activities and their physical effects, but they go beyond the specifics to attempt to rationalize the "adaptive framework of economic decision-making" (Woollett 1991:5).

Binford's first notable contribution to ethnoarchaeology was Nunamiut Ethnoarchaeology (1978). His analysis was based upon observations of Nunamiut Eskimo processing of caribou carcasses and of the faunal remains that were left after the activities. Binford suggests that situationally dependent behavior is the major factor in the generation of the archaeological record. This theme is one originally developed by Binford to make sense of the confusing variability in the Mousterian archaeological record (Binford and Binford 1966). One of Binford's major contributions has been the development and application of meat, marrow, and bone grease utility indices. He measured the yields of meat, marrow, and bone grease from specific portions of dissected domestic sheep and caribou carcasses. The descriptions of yields from the carcasses present them as groups of osteological elements possessing specific economic values in terms of their associated meat, marrow, and/or grease. These indices have become standard techniques for analyzing patterns of treatment of carcasses through distribution and breakage of skeletal elements (Woollett 1991:5).

Binford's views of situationally dependent behavior are supported by these indices. He applies the indices to observations of carcass utilization and faunal collections among the Nunamiut. He suggests that assemblage formation should yield clues as to the distance of the site from the kill, and seasonality of the kill. From his observations, Binford concludes that Nunamiut economic behavior is structured in order to achieve maximum access to available resources while exerting a minimum amount of cost in the process of procurement, processing, transport, and consumption of these resources (1978:133).

In observations on the processing of skeletal elements for marrow or bone grease, Binford notes that at present phalanges are not rendered for marrow or bone grease because it's "not worth it". However, he notes several elders recalling processing phalanges for grease during times of hardship. He suggests that the extent to which bones are processed in the archaeological record is a possible indicator of the subsistence security of a group at the time of observation (1978:32).

> Man did not make the bones; their form is not a product of any mental templates of designs for living. Therefore it becomes possible to set forth a completely culture-free taxonomy of bones. Any variability observed in the relative frequencies of anatomical parts among archaeological sites must derive from the dynamics of their use. Man's role is only one of partitioning, segmenting, and differentially distributing the segments of animal anatomy during the course of his exploitation of the animal. Little question could exist that any patterning derived from the faunal remains reflected use. (Binford 1978:11)

Binford's statement refers to his search for a culture-free method of observing human activity at an archaeological site. Within this statement lies the importance of studying selection and attrition of faunal elements. Archaeologists recognize that the archaeological record is incomplete. Bones may be introduced into sites selectively, and are destroyed by various agents, both natural (erosion, carnivore ravaging, etc.), and non-natural (such as cultural or human influence) at varying rates of speed. Acknowledging that the record is likely to be incomplete, we want to be able to assess selection and attrition in an assemblage. Assuming no human interference in selection and attrition, bones with the weakest structural density should be removed from the assemblage first, with the densest bones surviving the longest. When the expected scale is not obtained, and elements of densest bone are removed before less dense bones, then non-natural, or human agents (presumably through partitioning, segmenting, and distributing elements of an animal's carcass), are attributed as being instrumental in assemblage formation. Elements are selected by humans for their utility in respect to either meat, marrow or bone grease. The extent to which elements have been reduced for their utility greatly influences the appearance of the final assemblages.

More recently, archaeologists have applied Binford's basic concept of utility indices to other species. Lyman et al (1992), derived a standard meat utility index for phocid seals, which they believe is comparable with those of previous researchers for various species of mammals and birds. However, as pinnipeds are anatomically different from terrestrial mammals, the indices derived for other mammals are essentially unsuitable as a means of quantifying meat utility from the marine mammals.

Methods for deriving the seal index include skinning and weighing the hide and attached body fat, then disarticulating and weighing each skeletal element with and without attached meat. Abdominal muscle, viscera, body fat, and flipper elements were not included in the calculation of meat utility either because they had no associated bones, or as in the case of the flippers, no edible meat of any value (Lyman et al 1992).

All remaining meat weights were "normed" on a scale of 1-100, thus providing a %MUI (% Meat Utility Index).

Several problems exist with the index as created by Lyman and his colleagues. First, by weighing and using only the meat associated with major skeletal elements (e.g., humerus), approximately 28-37% (weight derived from sculp and blubber alone, Lyman et al (1992:533) of the seals' total body weight is automatically discarded. Also noted to be of great nutritional value are the abdominal muscles, which were also excluded from the index for lack of associated skeletal elements. Flipper bones were ignored for their nutritional values "as they contained very little muscle tissue" (Lyman et al 1992:534). Further, disarticulation and weighing of skeletal elements followed "standard biological procedures for measurement and dissection" (Lyman et al 1992:533). Results derived from these procedures are likely very different from the results which would be obtained had the researchers consulted with native informants and attempted to incorporate their knowledge of and cultural values for butchering of seals into their project.

Binford's study among contemporary hunter-gatherers (the Nunamiut) led him to suggest that culture, following Leslie White's ideas, is "the extra-somatic means of adaptation for the human organism" (Binford 1978:218). Variability within the archaeological record results from humankind's adaptation to specific, local situations in their surrounding environment. In other words, culture is essentially a by-product of adaptive behaviors expressed as stylistic differences in tools, clothing, houses, etc. Binford's theories are strongly biased toward situationally dependent behavior and the adaptive explanation of human behavior, leading to flaws in his culture-free models. Had Binford studied human decision-making in multiple groups of hunter-gatherers, generalizations that he made concerning human behavior would have been proven non-universal, even when regarding the use of prey animals.

The previous example illustrates that while Binford's generalizations of hunter-gatherer decision-making prove useful when applied to groups residing in similar environments (i.e., the Arctic), they are by no means universal for hunter-gatherers. Caution should be exercised when applying these models to past cultures. Modes of subsistence and of behavior change through time, in even as short a time as a generation.

Post-Processual Archaeology

In the early 1980s post-processual archaeology ushered in a wave of new research methods, primarily stressing the contextual analysis of archaeology. Processual archaeology advanced the philosophy that all questions concerning the human past could be answered provided the proper questions were asked by archaeologists (Claasen 1992:2). Methodologies involved arguing from the specific to the general. Some archaeologists, weary of the lack of humanity in the New Archaeology, which emphasized "science" over "history" and especially culture history (Binford 1962), urged a return to the history/culture history approach as another means of comparative analysis. Opposing much of the analytical approach of processual archaeologists, post-processualists argued that the individual in history is important (Hodder, 1985). Methods involve arguing from specific examples to generalizations (where warranted) based upon results of research.

Post-processual archaeology also fostered a renewed interest in social structures and gender structures. Function, a primary interest of processual archaeologists, became only one of many avenues of research which were reopened. Essentially all perspectives of archaeology were opened to re-interpretation (Hodder 1985). The perspective of gender is simply one approach in analyzing and interpreting archaeological data. This subject is further discussed below.

Cultural Factors in the Archaeological Record

The foregoing discussions have focused on studies relating to patterns in the archaeological record resulting from human and non-human subsistence activities. Now we must address a range of possible "non-economic" or "non-maximizing" cultural factors and their importance in the analysis of archaeological assemblages.

Every cultural group possesses certain characteristics which distinguish it from other groups. Such valuations perform two important functions in human activities and decision-making. For one thing, these valuations serve to place limitations or influence in some way the range and occurrence of possible decisions (modal decisions). For another, cultural factors also promote certain types of behavior (normative behavior) (Woollett 1991:6). Since "cultural factors" influence processes of economic decision-making and carcass utilization activities, they are instrumental in determining the results of these activities. Because they tend to be qualitative rather than quantitative in nature, cultural values cannot be analyzed through a mini-max approach.

Woollett has suggested (1991:6) that such "soft factors" as ideologies, concepts, ideas, and perceptions are often overlooked when reconstructing subsistence patterns. These factors warrant inclusion in subsistence strategy reconstructions because people do not live and make decisions in an entirely objective world. When making inferences about economic decision-making, we must consider priorities other than those which are the most economically efficient. It is important to recognize that many everyday decisions are made with regard to a "*perceived* , non-empirical world" (Woollett 1991:7).

Following Woollett, it cannot be assumed that people regard animals as simply units of food, and structure their behavior accordingly. Other resources such as the hair, hide, bone, blood, antlers, and hooves of the animal are also procured. When these elements are considered, the process of carcass utilization is further complicated. It becomes more difficult for archaeologists studying the archaeological record to distinguish if and which properties beyond specific osteological elements of an animal are being utilized, and how the yield of raw materials other than meat is measured.

The food optimization/maximization model is even further complicated by its disregard of the significance of emic conceptions of prey species, the spiritual significance of certain animals, and human-animal relationships which are culturally determined (Woollett 1991:7).

Chapter 2. Gender and Archaeology

> In the eyes of the Copper Eskimos, celibacy in either sex is a contemptible condition. A man is the natural complement of a woman, a woman of a man; neither is complete without the other...a woman is dependent on a man for shelter and for food, and a man needs a woman to dress the meat and skins of the game he kills, to cook his food and make his clothing. (Jenness 1922:158).

Jenness' statement, although a bit oversimplified, essentially contains within it the basic focus of this section, the issue of gender roles. Specifically examined is the manner in which gender influences variability in the formation of the archaeological record.

Previous research on cultural elements as factors of variability in the archaeological record is presented in depth by Woollett (1991:8-58). Gender is indirectly addressed within the framework of his discussions, but given no more nor less attention than any other potential element of variability. However, gender roles-often called the "sexual division of labour"-should be recognized as of more importance in the generation of archaeological faunal assemblages than has been done to now. Gender permeates most if not all aspects of human social organization, making it worthwhile to examine closely its implications for the formation of the archaeological record.

Gender as an element of archaeological assemblage formation is directly addressed within this work. Woollett (1991:13) divides cultural variability into five categories corresponding to the hunting and procurement of an animal, processing of the kill, distribution of the units of meat, consumption, and disposal of inedible remains. The reader is referred to this work for information on variability other than that originating from gender.

Past archaeological research has often excluded gender from its analysis. Studies centering on the "systemic" approaches advocated by the New Archaeologists considered socio-political variables of all kinds which are vital to understanding cultural systems. However, models formulated by Binford tend to rule out any cultural or "internal 'ethnographic' variables," including gender (Wylie 1991:35; Trigger 1991).

A growing body of literature regarding the study of gender in anthropology now exists. Hodder terms this study "feminist archaeology"-going a step beyond simply studying gender roles in archaeology, or "the study of the relations between men and women in the past." (Hodder 1991:168) Instead, feminist archaeology is conducted specifically from the critical viewpoint of females.

For the purposes of this work, using the term "feminist approach" may be somewhat inappropriate. Most of the ethnographic literature was written by men, from a male perspective (exceptions include Fienup-Riordan 1983; Ohnuki-Tierney 1974; Giffen 1930; Briggs 1970; and Ager 1980). Essentially, one must overcompensate for the invisibility of women's activities, interests and contributions in early ethnographic studies by returning to the "remedial" forms of anthropology outlined by Wylie (1991:39), in which these aspects of culture become the primary focus of investigation. In determining roles played by males and females in the past, and the effects of each of these roles in the formation of the archaeological record, gender archaeology is likely a more suitable term.

Previous investigations have drawn attention to the invisibility of women in the archaeological record. These authors have also suggested various methods of research aimed at "finding" women in prehistory. Conkey and Specter (1984) argue that archeology is androcentrically biased, with this bias giving an inaccurate view of the past. One of the major points of consideration is, first, the assumption that sexual roles of the present remain unchanged from the past. Trigger (1991) advocates caution when examining traditional roles. For example, because we know that Pueblo potters were exclusively female in historical times does not imply that they were always exclusively female (Trigger 1991:552). In a sense, the perspective of continuity in gender roles legitimates the present by validating the past. Conkey and Specter (1984) urge a reconsideration of women's roles in the formation of the archaeological record. They suggest that this reconsideration might aid in the process of making women more visible in the archaeological record.

Second, more attention is usually devoted to "dominant" activities carried out by males. Females are often seen as weak, passive, and dependent upon strong, aggressive males. Ethnographic materials usually describe females and female activities in relation to males (e.g, Harold's wife, Andy's daughter). An excellent example may be read in Waldemar Bogoras' account of the Chukchi (1909:548).

Claasen (1992:2) notes that, typically, archaeology addresses past cultures' forms of social organization that overlooks gender structures. She cites three primary reasons for the "de-gendering" of activities: (1) The actor's gender was considered unimportant to the study; (2) gender assumptions were unwarranted; and (3) the investigator believed that the activity was performed by both genders in the society. Whether determined by an underlying struggle for power, or by simply being the most practical method of accomplishing a task, gender as a variable within the archaeological record warrants a closer study.

O'Brien (1991) and others (Guenther 1991; Hastorf 1991; and Hughes 1991) have attempted spatial distribution studies of artifacts in efforts to discern gender-affiliated activity areas. O'Brien advocates the use of the direct historical approach in conjunction with the archaeological record as a means of attempting to discern women's roles in prehistory. The direct historical approach is a return to the traditional archaeology often criticized by scientific archaeologists (Binford 1962); however, it is an alternative method which integrates ethnographic data with archaeological data in an attempt to interpret the past (O'Brien 1991; Trigger 1991).

Gibbs (1987:80) distinguishes between the terms sex and gender in anthropology.

> ...as a starting point, the difference between 'gender' and 'sex' should be noted. 'Sex' is a physiological distinction (woman/man), whereas gender (female/male) is purely a social construct, comprising the roles given to, and identities perceived by, men and women in a particular society. (1987:80)

At this point I feel it necessary to modify Gibbs' original statement, which, in my opinion, reverses the distinctions. The physiological distinction between the sexes is either male or female. The sex of an individual is determined at conception, and in every other species known to humankind is referred to as male or female. Humans are biologically either female or male. Gender, however, is also as Gibbs states, a social construct involving identities and roles assigned to and perceived by males and females in a particular society. However, gender should be referred to as man or woman, as each term carries with it an implicit set of actions and duties to be carried out by the individual.

Sex is unchanging. Biologically, males have always been and will always be males. The same applies to females. However, gender is a fluid entity, changing through time, as illustrated by Gibbs' study of gender roles in the European Neolithic (1987). Gender, a role played by an individual within her/his society, also allows deviations from the "norm" or standard behavior of a social group (Hodder 1987:4). Cheyenne Indians developed a third "gender", or the *berdache* system, to incorporate as acceptable and productive members of society males who felt otherwise unable to fulfill the roles of "mighty hunter" or "fearless warrior" (Hoebel 1978:83). The idea of multiple genders pose a problem from the archaeological standpoint. The berdache are "arguably a third gender, or 'between gender', but their material culture is indistinguishable from that stereotypically assigned to women or men" (Claasen 1992:3). Claasen proposes that we cannot know the number of genders present in past cultures, and that we do not adequately understand the ways in which gender is encoded into material culture of different societies.

Owing to their basic differences, the distinction between sex and gender becomes very important but sometimes quite difficult to discern when examining the archaeological record. Some languages do not distinguish between the two terms. In Russian, the term pol encompasses both meanings (Vasil'evsky, R. 1993, personal communication). Further, "Sex, the biological condition and gender, the cultural condition, have different degrees of archaeological visibility" (Claasen 1992:2).

Multiple gender ideologies exist among the Hua of Papua New Guinea (Meigs 1990:102-103). In the chauvinist ideology, men regard women as dirty and dangerous. Conversely, an envious attitude stems from the male belief that the female body is superior to the male body, with greater longevity, stamina, and more rapid growth (at puberty). According to Hua mythology, the original Hua peoples were females impregnated by visiting males, thus creating the present-day Hua. A third gender ideology is of an egalitarian nature. Women's bodies are acknowledged as being too "wet" with an excess of fluids which are necessary for reproduction. Men's bodies are recognized as being too dry, and hard; but good for defense. This view represents two extremes of the same continuum, and illustrates the interdependency of the two genders. Males are needed for protection, and females are needed for reproduction, as defined by their roles.

Women's Roles in Society

It is argued that women play active roles in societies. Hodder (1984) suggests that decoration and elaboration of domestic spheres may reveal more about negotiation of power between men and women than about symbolizing contact and interaction between local groups of people.

Ager (1980) argues that western Alaskan Eskimo women are active agents in procuring supplementary foods, distributing meat and manufactured products, and running the domestic scene. Traditionally, women with skill as seamstresses were highly sought after as wives (Ager 1980:308). Women act as the transformers of "raw" or initial resources into functionally serviceable or edible items. Coupled with this ability is a vast knowledge. A woman must know how to skin, tan, and sew hides to make warm and waterproof clothing, coverings for kayaks, and bags and containers for storing food and personal items. The ability to provide the aforementioned items enables the woman to contribute both directly and indirectly to her husband's success as a provider (Ibid.).

Gender roles may be reflected in the spatial distribution of processes of the "production/storage and preparation/disposal" of food (Hastorf 1991:134). According to Hastorf, the creation of gender results from general relationships within the family concerning divisions of labour, differential or restricted access to goods, production, social negotiation, and reproduction (1991:133). Hastorf proposes that one avenue open to exploration of gender roles is through food use, especially the use and restriction of highly symbolic foods. Areas within residential sites where women's activities are most often centered include meat storage areas (Binford 1978), freezers (Binford 1978; Fienup-Riordan 1983), and/or hearths and kitchen areas (Briggs 1970; Hastorf 1991; and O'Brien 1991).

Taboos and food avoidances set and maintain boundaries in situations which are marginal, potentially dangerous, or socially sensitive. These situations generally relate to acts of or results of sex (i.e., childbirth, miscarriage, infidelity) (Hastorf 1991:134). Hastorf further suggests that in cultures in which men have strict control over women's sexual activities and moral codes, sex and food taboos and restrictions generally are not present. However, in societies where men do not have direct control over women's sexuality, and dominance of the sexes may be contested, strict taboos and avoidances may be present. Taboos and avoidances may exist regarding food consumption, particular activities such as work or speech, and sexual activities (i.e., abstinence before a husband sets out hunting). These sorts of restrictions allow women to have control over themselves, but within certain limits (Hastorf 1991:36).

In the Arctic, taboos are placed on eating eggs in the Mackenzie Delta, and Coppermine River area (Stefansson 1914:136). Boas notes that among Eskimos from the Eastern Arctic, adolescent girls are forbidden to eat eggs (1975b:504). On the coastal areas of the Barren Grounds only old men and children are allowed to eat eggs (Birket-Smith 1976:133). Women are forbidden to eat animal tongues (Boas 1975b:504).

Among the Caribou Eskimo, Birket-Smith notes that taboos usually only affect women, especially those with small children (1976:138-39). Another specific example may be drawn from 19th century Victorian England dinner parties. Young women were urged to avoid "strong" meat for fear of it making them lustful and wild. Older women and men were exempt from this rule (Jameson 1987).

Procurement

In terms of procuring food, gender roles may be best observed through taboos and avoidances. According to Woollett (1991:13), taboos and avoidances generate behavior which appears "illogical", running contrary to a purely optimal foraging framework.

These behaviors appear to restrict a totally optimizing subsistence system in that hunters do not always select species which are most readily available or most nutritious.

Most taboos and avoidances pertain to the integrity of the hunter, who must not offend the game. Avoidances are usually limited to specific situations or times, and are more common than permanent taboos. One of the most obvious taboos/avoidances among Eskimo populations stems from the desire to prevent contamination or pollution of species, manifesting itself in a land/sea dichotomy. Central Eskimo (between Hudson's Bay and Eastern Alaska) believe that if all taboos are observed, sea mammals will allow themselves to be caught, even offering themselves to the hunter. Those hunting land mammals should not immediately hunt sea mammals (Boas 1975a:120). Clothing worn for hunting sea mammals must be changed before hunting land mammals: a hunter who has hunted walrus must change clothes before going out to hunt caribou (Boas 1975a:123). The Nugumiut of Frobisher Bay allow the consumption of walrus and caribou on the same day, but not the consumption of salmon and walrus on the same day (Ibid.). Animals from the sea must not be eaten at the same time as animals from the land. Arrows may not be glued using seal blood, as they will be used to hunt caribou, a land mammal. After killing an albino caribou, a man must not work again for five days. Any hunters who have committed murder or eaten of human flesh should not kill a whale or caribou. (Birket-Smith 1976:96; Boas 1975a). Hunters must be "clean" when trying to obtain food, thus they must not have had any contact with menstruating women (Boas 1975a:492), with women who have recently given birth or had a miscarriage, or who have dealt with corpses (Boas 1975a:120; Rasmussen 1976a, 1976b). Animals are capable of sensing blood, and the vaporous stain emitted by blood angers them. Any animal sensing an unclean hunter will not allow itself to be killed (Boas 1975a:120). Menstruating women or women who have recently had miscarriages must stay indoors, and avoid places frequented by caribou; they cannot handle meat, and cannot directly refer to or look at animals for fear of scaring them away (Boas 1975a; Birket-Smith 1976:95).

Game must be treated in a respectful manner in order to assure that it is not offended. Walrus (a sea mammal), caribou (a land mammal), and salmon ("land" fish), may be taken into the house through the same door, on the same day, but must never be eaten together on the same day (Boas 1975a:123). When a man brings a caribou home, the wife touches it in greeting as she would a human visitor (Birket-Smith 19276:95). Before butchering, a woman gives seals a "drink" of fresh water. A bit of fresh water is poured over the head and the back of the seal. It is believed that they live in salt water and are thirsty all of the time (Birket-Smith 1929:95; Jenness 1922:114).

Ainu women are forbidden to hunt all land or sea mammals except hares (Ohnuki-Tierney 1974:19). All sea fishing with nets or traps is prohibited, but lake and river net fishing is allowed. Women may gather shellfish, and small marine life from tidal pools and along the edge of the ocean (Ohnuki-Tierney 1974:29; Batchelor 1927). Chukchi women, although not directly forbidden to hunt, are mentioned by Bogoras as being heavily dependent upon plant foods:

> On the whole vegetable food is much more used by the women and children than by men. In tales, men living in solitude are always described as hunting animals and procuring animal food. A solitary woman is more frequently described as gathering herbs and roots, laying in stores of vegetable food, and often it is told she brings up on it several small children. (Bogoras 1909:199)

Eskimo women are noted to procure "less important animals" with which to supplement the diet while men pursue larger game (Giffen 1930:7). As a task enabling women to be out of direct danger; traplines are also run by women (Giffen 1930:7). Furs acquired from these traps are cured by the woman and remain her property to dispose of as she wishes. After the beginning of the fur trade, women were able to trade their furs at trading posts for the little extras they wanted for the household (Briggs 1970).

Processing and the Sexual Division of Labour

In many non-industrial societies, and especially in the Arctic, male and female roles are complementary, and even dependent upon one another (see the preceding discussion of the Hua). Complementarity is a concept somewhat difficult to understand in the context of Western gender roles, which at times appear antagonistic and competitive toward one another.

Woollett (1991:21) notes that restrictions place limitations on participation in processing activities and also regulate contexts and conditions in which they occur. Woollett also notes that the sexual divisions of labor are "marked in processing activities and illustrate the importance of the contexts of processing" (Ibid.). Jarvenpa and Brumbach's ethnological report (1983) of Athapaskans' processing of a chance moose kill illustrates the sexual division of labour. The men butchered the moose, but regarded their work as clumsy and messy, saying that such work is generally done by women. Chard (1963) notes that among the Nganasan, while men kill the reindeer, women are sent out to retrieve it.

Women of Qaluyaarmiut on Nelson Island process, dry, and braid herring, a major subsistence item during the winter, for storage (Fienup-Riordan 1983:92-110). Fienup-

Riordan notes that walrus are butchered upon the ice by hunters, with shares going to all of the hunters present (1983:134-135). The quartered walrus or other sea mammals are then stored by women in storehouses for later processing. Further processing by women is usually conducted in small groups, usually kin-related (Fienup-Riordan 1983:86). Smaller mammals (seals) are brought back whole to the residence, to be butchered and distributed by women. Interestingly, age divisions occur in processing. Young women do the preliminary processing. Old women skin seals including the head in order to use the entire skin as a poke. Young women do basic forms of processing and the older women perform tasks requiring more skill (Fienup-Riordan 1983:84, 134). Large seals (rough seals) are processed by hunters on the ice and brought in for storage by the men (1983:80).

Based upon a study conducted among the Efe in Central Africa, Peacock (1991) concluded that women are usually allocated tasks which do not interfere greatly with childbearing. Activities such as food processing, gathering foods, performing agricultural labour, and fetching firewood and water, while boring, do not place women in direct danger, neither do they require travel over long distances away from the residential base (Peacock 1991:355). In other words, these are tasks that must be performed, and may be performed with numerous interruptions (from children), unlike hunting.

Sexual divisions of labour exist among the Copper Inuit, but as Stefansson notes, "...under certain circumstances a man may do any kind of woman's work, and a woman any kind of a man's work. There is no taboo restriction in this matter apparently" (Stefansson 1914:103). Jenness (1922:88) notes that Copper Inuit women sometimes hunt seal and caribou. However, these are only the younger women, presumably those without children. Every member of society takes part in fishing. In the fall, when days are running short, and there is an urgent need to finish the winter clothing before going onto the ice for sealing, men are noted to assist women in scraping caribou skins (Jenness 1922:88).

Binford (1978) provides detailed descriptions of butchering methods and selection of bones for marrow processing among the Nunamiut of northern interior Alaska. Caribou and large game are usually initially butchered at the kill site, then cached or carried back to the residential camp. With the availability of the snowmobile, less immediate field butchering occurs. Binford's accounts of food preparation and disposal of bones distinguishes between genders. However, in the analysis of site formation, gender is omitted; rather, site formation is concluded to be situationally dependent.

Binford (1978:152-155) observed two types of bone breaking patterns. Males obtain marrow bones and prepare them for cracking by removing the skin and scraping periosteum away from the area to be cracked. Sometimes they will place bones in the fire to warm them. This procedure facilitates cracking and changes the nature of the marrow. Jenness (1922:103) observed that marrow bones were sometimes heated in a fire to alter the marrow's texture. To crack the bone, it is held in one hand and struck with another bone, a knife handle, or with a stone. The marrow is removed and consumed, and the bone tossed out of the way (Binford 1978, 1981). Women break bones sometimes by using the hand-held method, but more often use an anvil, or two anvils. A skin is laid down on the ground to catch the bone fragments, and one or two stone anvils are placed on the skin. The bone is prepared for cracking as described above, then laid on the anvil and struck on the mid-shaft of the bone. Marrow is set aside in a container; and bones are either reserved again for making bone grease, or discarded in a pile (Binford 1981:158-59).

The two types of bone breaking differ in a number of aspects which would likely be reflected in the archaeological record. Men process marrow in an expedient manner, usually for snacking purposes. Results of this method are low levels of production and consumption. Breaking is done on an individual basis. Women process bones on a large scale, usually just prior to moving out of winter camps in the spring. Bones are stored, and later processed for marrow in large quantities. This is usually done in an "assembly-line" fashion, with work groups often consisting of several women, and who are often related to one another. Large quantities of marrow are obtained at a single processing. Women's processing of marrow bones is conducted on a large scale, and is labour-intensive. Marrow obtained from processing is shared within the family group, and eaten as "akatuk" (Eskimo ice cream) when guests are present (Binford 1978:146-147). Refuse is saved to make bone grease later, another female associated activity (Binford 1978:157-159). Very little ethnographic evidence related to this activity has been described, but Binford (1978:158-9) notes that it leaves a distinctive signature (fire-cracked rocks, wood, ashes, pulverized bones).

Distribution

Woollett notes (1991:20) that "Once a carcass was introduced into the camp, it essentially passed out of the control of the hunter and into the control of the domestic sphere, women and those to whom portions are due". Women are generally responsible for butchering and distributing meat to family and community members (Jenness 1922; Bogoras 1909; Fienup-Riordan 1983; Briggs 1970; Ager 1980; Giffen 1930). Systems of distribution vary between men and women. Male distributions appear to be based on non-kin relationships, such as hunting partners or other sharing relationships. However, men often form hunting partnerships with brothers or other male relations. Female distribution is generally based upon kin relationships. Animals brought into camp by hunters are distributed by the wife or mother (if the hunter is unmarried) into the community (Fienup-Riordan 1983). Distributions occur initially along kin lines, with further distribution occurring throughout the community. The first catch of a hunter each year of a "bearded seal" must be distributed at a seal feast given to the village by the wife or the mother of the hunter (Fienup-Riordan 1983:190-198). Women who are not kin to the hunter or his wife are invited to attend the feast or "seal party". After the first catch, bearded seals which are procured by men are distributed on the ice at the time of the kill. The seals are divided among all of the hunters present at the kill, and sometimes the hunter reserves portions for his brothers who may be absent (Jenness 1922:114).

Prior to a bear feast, Ainu must distribute meat to all guests (Ohnuki-Tierney 1974:95). The family who raised the bear must not eat of it. They instead save the left foreleg in the smokehouse to eat one year later. Men distribute bear meat or any other meat during feasts. Women are strictly forbidden to eat of the head or forelegs. Men eat the forelegs and the head, but not the hind legs-believing that eating the hind legs will make them weak and run in the face of danger (Ohnuki-Tierney 1974:95). Bones of the bear are discarded by the men; they are taken away and deposited in a pile in the mountains. Two dogs must be sacrificed when the bear bones are deposited.

An extreme example of distribution resulting from restricted access to resources occurred among the slave societies of the American South (White 1985; Blassingame 1979). Slaves were generally divided into work groups according to age and sex. Young women, those without children, and women past the age of childbearing were often relegated to working in the fields with groups of men. These slaves were the least well-fed, and the hardest worked. Pregnant women were given reasonably better care and food, being assigned duties such as spinning and weaving, working in the master's house, or caring for other children. Slaves working in the big house were in a superior position, being the best fed, and the least worked. Working in the kitchens allowed access to more choice foods than were generally provided to the majority of slaves. As most of the slaves working in plantation houses were females, they were able to steal choice foods to provide to their own families. Male slaves were rarely accorded this opportunity, owing to all of their time being spent in the fields or other forms of hard labor. As a result, women became recognized as providers of status foods, and as higher status individuals than males.

Preparation and Consumption of Food

Woollett (1991:31) states that a basic contributor to variability in the construction of the faunal record is the size of the cooking pot. In preparing caribou skulls for cooking, Copper Inuit split them lengthwise and crosswise before putting them into the pot. Brains are removed and eaten (Jenness 1922:103). All marrow bones are preserved for bone grease production. Jenness, in referring to the Copper Inuit, does not distinguish whether males or females perform the activity of marrow processing; but inferring from the Nunamiut example (Binford 1978), we may assume that it was a woman's task. Jenness (1922:103) comments that the Copper Inuit regarded caribou fat or tallow as a delicacy, and that it was highly prized.

Summary of Gender Contributions

This brief examination of literature concerning gender roles in societies, and of some northern ethnographic materials in particular, must be regarded as an initial foray by the author into the realm of gender in archaeology. It is argued that studying gender within the archaeological context is a valid and useful endeavor, one which is at present still in a developmental stage.

Archaeologists have argued for a reconsideration of previous perceptions of sex and gender roles in human societies, stating that women are in fact significant contributors to economic subsistence and culture. Advocates of the Direct Historical Approach argue that the ethnographic record is a very useful tool in determining and interpreting past gender roles. Several examples of female roles have been briefly examined within this discussion. The question remains, is it possible to study gender through zooarchaeological remains? It is argued by the author that detailed studies of zooarchaeological assemblages combined with ethnoarchaeological studies such as Binford (1978) may provide insight into gender roles in prehistory.

This thesis will attempt to deal with the problem of studying gender through zooarchaeological remains by examining five faunal assemblages from archaeological sites in the Northwest Territories, Canada. Evidence indicating the presence or absence of gender contributions to the formation of these faunal assemblages will be discussed.

Chapter 3. A Review of Previous Anthropological and Archaeological Investigations

Territory

The archaeological sites examined in this thesis are located in what was the extreme western edge of the traditional territory of the Copper Inuit. Therefore, a general discussion of these people is presented below. Further specific discussion is presented later, as warranted. Other Inuit groups and archaeological cultures are also noted, to provide a context for the current research. Traditionally, the Copper Inuit inhabited the west central Canadian arctic from Wise Point on the mainland in the west to southern areas of Banks Island in the north. The southern extent of their territories seems to have been in the region of Great Bear, Beechey and Contwoyto Lakes. To the east, the Perry River was the boundary between Copper and Netsilik Inuit territories. The southern two-thirds of Victoria Island was also inhabited by the Copper Inuit (Damas 1984:397).

Contemporary Copper Inuit territories and land use patterns have been examined in an effort to determine the extent of land utilization near permanent settlements. Farquharson (1976) reviews land use and subsistence in the Arctic, focusing on regions centering around Coppermine, Cambridge Bay, Bathurst Inlet, and Holman. For each area he partitions land use into three time periods:

I. Pre-1916-20: The time period prior to traders.

II. 1916-20 to 1954: This period encompasses a shift from a hunting economy to one of hunting and trapping, ending with the construction of the DEW Line.

III. 1954-1974: This period introduced wage labour with the construction of the DEW Line. Exact dates vary for the separate regions discussed, but all fall within these general dates (1976:33).

Farquharson separates the history of the Holman region into four time periods owing to its sporadic occupation until the late 1920's.

I. Pre-traders: This is pre-1923 in the northern part and pre-1919 in the southern part of the region.

II. 1923-1939: This period is distinguished by the arrival of traders prior to the establishment of the H.B.C. (Hudson Bay Company) post.

III. 1939-1965: Spans the period from the establishment of the H.B.C post until relocation of the village in 1965.

IV. 1965-1974: Encompasses the establishment of the new village and the history of the village to the present (1976:56).

Farquharson discusses the major groups of people living in each region. He discusses the shift in subsistence from a mainly hunting to a primarily hunting/trapping economy during Period II. Permanent trading posts were established, providing Inuit access to rifles, traps, ammunition, "white" food, as well as other trade goods.

In general, a shift occurred from a very mobile lifestyle to one of more permanent settlements near the trading posts. Hunting patterns changed to accommodate trap lines. The introduction of snowmobiles enabled trappers to live in one area and maintain large hunting and trapping territories. Most hunting during the winter took place while checking the lines. People began storing more food for winter, and setting trap lines near their caches. Trap lines generally ran from the coast inland up rivers and streams, as well as along the coast. Trapping intensified, following a greater desire for and dependence upon the Hudson Bay Company trade goods (1976:58).

Most Copper Inuit still hunt caribou during migration periods, and seals throughout most of the year. Fishing on major lakes and streams is still conducted. The introduction of nets intensified fishing activities. Those people living in areas not rich in caribou frequently trade for skins for clothing.

Usher (1976) examines land use in the western Canadian Arctic centering around five settlement areas of Aklavik, Inuvik, Tuktoyaktuk, Paulatuk, and Sachs Harbour, dividing the history of the past 70 years into three major periods.

I. Whaling and early fur trapping-the period ended during the 1920s or 1930s. Large numbers of Alaskan Eskimo migrated into this region.

II. Peak in the fur trade-ended during the 1950s with the decline in the fur trade. There was a shift towards purchasing schooners, and new patterns of residence and land use.

III. Modern period-fur trapping declined and dependence on wage labour increased. Increased shift towards settlement life, but through the use of snowmobiles, there was a continued use of outlying areas for hunting and trapping (1976:21).

Subsistence patterns have changed, but dependence upon fish and game is heavy There is an intensification of land use near settlements. People depending on wage labour generally hunt only on the weekends and holidays. At Paulatuk everyone depends on hunting, trapping, and fishing as there is little or no wage labour.

Early Explorations Among the Copper Inuit

The Copper Inuit were first observed by Europeans during the latter half of the 18th century. Samuel Hearne traveled to the mouth of the Coppermine River in 1771, guided by Chipewyan Indians. There they encountered a group of Copper Inuit whom the Indians slaughtered (Jenness 1922). The next recorded contact occurred in 1821 when Captain John Franklin communicated with a group of Copper Inuit near Bloody Falls. From 1821 to 1910 contact with the Copper Inuit remained sporadic. Early explorers occasionally encountered these people and wrote brief descriptions of these experiences (Jenness 1922:28-31).

Between the years of 1908-1912, the Stefansson-Anderson Expedition, led by Vijhalmur Stefansson and Rudolph Anderson, traveled the Canadian Arctic coast from Cape Bexley, Dolphin and Union Strait, and Victoria Island west to Point Barrow Alaska. Two of the goals of this expedition included conducting anthropological and zoological research. Stefansson (1913) mentions searching for the "blonde" eskimos described by earlier explorers, and suggested that the Copper Inuit originated from Eastern Arctic and Greenlandic cultures. He lived with the Coronation Gulf Inuit and the MacKenzie Inuit, learning their languages, digging archaeological sites, and collecting items of material culture. In another publication, Stefansson suggests that the "blonde eskimos" were a result of intermarrying with Scandinavian settlers in Greenland (Stefansson 1914a). Later research disproved Stefansson's theory regarding the origins of the Copper Inuit. After this expedition Stefansson published his personal account of his experience among the Copper Inuit, providing detailed descriptions of their subsistence and social organization in My Life With the Eskimo (1913).

Stefansson (1914b) describes Central Inuit territory between Hudson Bay and Mackenzie Bay, including Banks and Victoria islands. Relying on native informants, he discusses the types of trade between the groups of Central Inuit, both at the time of his writing and in the past. Major trade routes and items of trade along these routes are noted, as well as the 'tribes' engaging in most of the trading. Stefansson describes the seasonal gatherings of the Central Inuit, and their role in the redistribution of materials both to the east and west (1914b). Jenness (1917:83) writes that "The desire to trade often impels them to make extensive journeys". Stefansson's discussion covers the role of the Copper Inuit in Canadian Arctic trade, their wealth (perceived by him), and their method of maintaining it after their primary source of exotic material, H.M.S. *Investigator*, was exhausted.

Stefansson's work is clouded with a capitalist, developmental perspective common to explorers of this period. Of fundamental importance are the listings of the separate bands of Eskimo and the regions that they inhabit. Also important are descriptions of trade items considered important by the natives for which they would be willing to journey long distances, as well as the description of the boundary where east meets west in terms of trading and overlap of goods.

During the years 1913-1916, as a member of the Canadian Arctic Expedition led by Stefansson, Diamond Jenness, a member of the Southern Party, conducted anthropological and ethnological research along the Arctic coast of Canada and adjacent islands. He spent just over two years living among the Copper Inuit compiling the first extensive ethnography on these people (Jenness 1922). While more recent ethnographic works have been conducted (Abrahamson et al 1964; Birket-Smith 1976; Damas 1972, 1984; and Oakes 1991), Jenness' contribution remains the definitive work on the Copper Inuit today.

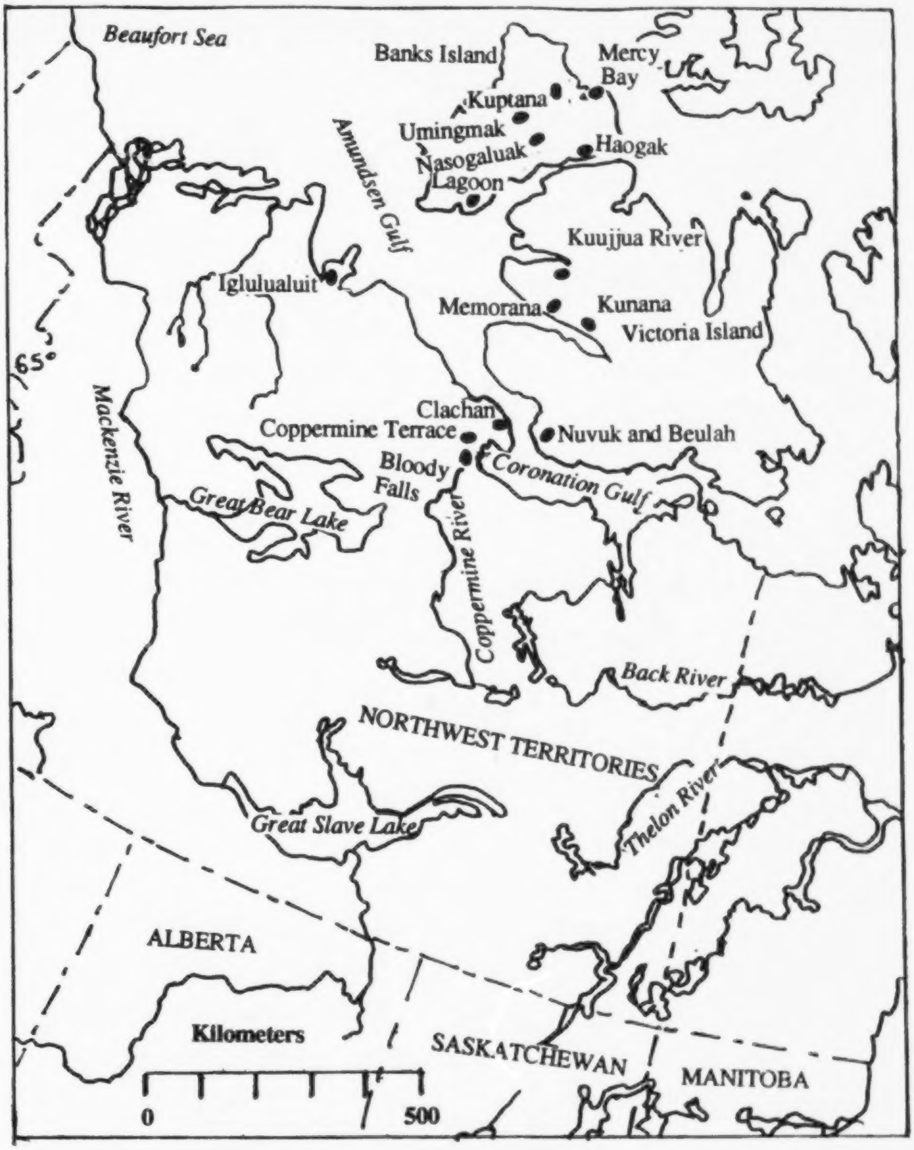
Previous Archaeological Investigations In the West-Central Canadian Arctic

In 1955, E. Harp conducted a brief archaeological survey of the western shore of Coronation Gulf between Cape Krusenstern and Coppermine, and of the Dismal Lake area. He recorded several coastal sites in Coronation Gulf that he suggested were late prehistoric, and an historic site on Dismal Lake (Harp 1958).

W. E. Taylor carried out a brief survey for the National Museum of Man in 1963, which covered the Arctic coast between Cape Parry and Cambridge Bay, N.W.T. Seventeen sites were located and tested during the survey, and were determined to be Middle Thule (A.D. 1000-1500) (Taylor 1972). Taylor returned to the area and conducted an aerial survey of the southern shore of Amundsen Gulf between Cape Young and Cape Parry, visiting 61 sites. In 1989 and 1990, Taylor excavated several Thule winter village sites, spending a good deal of time at the Pearce Point site in 1990. At this site he discovered early Thule artifacts, leading him to conclude that some of the Thule winter village sites date to the early Thule period occupation (Stevenson 1990).

Taylor's report of fieldwork conducted on Banks and Victoria Islands during the summer of 1965 is directly relevant to this survey. His fieldwork aimed to excavate more extensively sites on these two islands which were located during the 1963 survey, and to examine sites at Shoran Lake. Sites tested yielded predominantly Dorset and Pre-Dorset artifacts, confirming the archaeologists' expectations (Taylor 1967).

Figure 3.1. Map of West-Central Canadian Arctic


Beaufort Sea
Banks Island
Mercy Bay
Kuptana
Umingmak
Nasogaluak
Lagoon
Haogak
Amundsen Gulf
Kuujjua River
Iglulualuit
Memorana
Kunana
Victoria Island
65°
Mackenzie River
Clachan
Coppermine Terrace
Nuvuk and Beulah
Bloody Falls
Coronation Gulf
Great Bear Lake
Coppermine River
Back River
NORTHWEST TERRITORIES
Thelon River
Great Slave Lake
ALBERTA
Kilometers
0
500
SASKATCHEWAN
MANITOBA

Testing on Shoran Lake at the Umingmak site, located just southwest of the Shoran Lake site, revealed "a site complex, larger, richer and more complicated than the Shoran Lake site, [which] produced over 400 artifacts." (Taylor 1967:227). The assemblage consists of samples from 12 different test areas within the site. Taylor estimated this site to be Pre-Dorset in origin, and compares the Umingmak and Buchanan Pre-Dorset assemblages. While the assemblages are similar in many respects, they "contrast in their ratios of quartzite to chert tools and in their frequencies of large quartzite bifaces, of thin quartzite bifaces and of burins" (Ibid.). Muller-Beck (1977) excavated the Umingmak site during 1973 and hesitates to assign a type to the artifacts recovered, stressing the lack of sufficient data.

A combined team of German and Canadian archaeologists, directed by Müller-Beck excavated the Umingmak Site during the summers of 1970 and 1973. Their goals were to collect archaeological data from a still well-preserved periglacial stratigraphy; and to test, under difficult conditions, excavation techniques that had been developed for use in Central Europe, as well as looking for hints to help in understanding the technical means of human adaptation to the environment. Radiocarbon dates from the site range from 2485+/-200 BP to 3440+/- 160 BP (Müller-Beck 1977:vi).

Two primary areas at Umingmak were excavated. In 1970, area IA was excavated, and in 1973, area ID. Owing to differential weathering processes, the bone frequencies at ID were higher. Hahn (1977) suggests that area ID may have been a refuse dump. This interpretation is supported by a lack of architectural structures, but artifacts have been found throughout the deposit. High frequencies of calcined bone were observed, providing evidence that bone was being used for fuel at this site.
Hahn (1977:23-46) does not offer definite conclusions as to the function of the site or the duration of occupation. Campen's analysis of stone artifacts suggests that areas IA and ID are actually two different settlement complexes (1977:56-57). Trapezoidal quartzite points present at area ID are absent from IA.

Müller-Beck (1977:69-71) provides a detailed description of eight bone artifacts recovered from the 1970 and 1973 excavations. All of the artifacts show decoration, and Müller-Beck believes these decorations pertain to the function of the artifact. However, he cannot factually substantiate this belief. He further suggests that the site functioned as a summer base camp that was utilized by both men and women.

Caribou and muskox comprise the majority of the faunal assemblage at the Umingmak site. von Koenigswald (1977) notes that while caribou are more plentiful on the island, muskox dominate the assemblage. He attributes these high frequencies to the sheer bulk of the "package" of potential resources represented by a muskox, which is roughly three times the size of a caribou. Muskoxen's particular mode of defense also renders them much easier to hunt and kill than caribou.

von Koenigswald's study confirms Taylor's prior observation (Taylor 1967:227) that muskox composed 80-90% of all bones present. von Koenigswald observed a very distinctive form of butchering at the Umingmak site, noting that animals were introduced into the site whole for processing. No complete long bones were recovered from the site, which provides evidence for marrow processing. von Koenigswald (1977:74-80) proposes that the site was occupied during the summer, and that its occupants were processing meat for winter consumption.

R. McGhee (1970) conducted archaeological investigations during 1968 in and around the area of Bloody Falls. Sites inventoried in the Bloody Falls study include the Bloody Falls site, and the Coppermine Terrace sites of Sandwillow, LaPointe, Willowherb, and Elgok. McGhee states that evidence of the Arctic Small Tool tradition is present at the Bloody Falls site. He hypothesizes that two distinct occupations may have occurred at the site, but that all of the artifacts recovered probably constitute one seasonal occupation. Radiocarbon dates at 1350 BC are consistent with the artifact assemblage, which are of general Canadian Pre-Dorset types. Tools made from basalt and metamorphic rock are found at Bloody Falls, that McGhee states probably demonstrates use of locally available materials. Identical artifacts made of different materials were recovered in the other sites, suggesting Indian occupation (McGhee 1970:58). McGhee concludes that the artifacts at the Bloody Falls site "do not provide any new information on the derivation of the Late Arctic Small Tool tradition ground stone industry" (McGhee 1970:59).

McGhee notes that the artifact assemblages from the Coppermine Terrace sites are non-Eskimo in origin. He suggests that there were several groups of hunters occupying the Bloody Falls area who were following the northward-migrating caribou herds. No definite dates from the Coppermine Terrace sites were obtained, but projectile point styles indicate Paleoindian cultures of 7-8000 BP.

A series of radiocarbon dates suggests a more recent date of the first millennium AD (McGhee 1970:64). However, the radiocarbon dates were all taken from surface-collected materials. Occupations dated could be more recent than the artifacts, but McGhee disagrees, noting that (a) all dates cluster within a 500 year span, (b) artifactual evidence for later occupation by Dorset Peoples exists, and (c) there is a total lack of Dorset culture in the survey area (1970:64). He refrains from estimating the age of the sites, stating the need for further evidence.

Using data from sites on Victoria Island and the Coppermine River, McGhee (1972) attempts to determine the origins of the Copper Inuit. He postulates a progression from Thule Culture to Copper Eskimo Culture by devising three periods labeled Thule (AD 1000-+/-1600), Intermediate (AD 1600-1771), and Historic Copper Eskimo (AD 1771 - circa 1857). McGhee uses specific archaeological data for each period to support his theory.

Thule: Cultures migrated east (approximately AD 1000-1600) into the Victoria Island-Coronation Gulf area from Alaska. These people depended heavily upon whaling and hunting caribou during seasonal migrations. Large amounts of food bone refuse, particularly seal and caribou, were found in the Thule sites. Thule culture is represented by the Memorana and Bloody Falls sites. Semi-subterranean houses were constructed of heavy stone, sod and wood, and located near river mouths or along the coast. Artifacts were highly decorated.

McGhee concludes that the Memorana site is primarily Thule with a few minor inconsistencies. Occupation is estimated at approximately AD 1200-1500. McGhee proposes that the Bloody Falls site is also Thule with a distinct regional appearance, identifiable tools such as copper fish hooks and ulu blades. Very little animal bone refuse is found at the Bloody Falls site. The majority of the faunal assemblage consisted of caribou. Large quantities of fishing gear were also recovered, suggesting that fishing played a large role in subsistence. McGhee postulates that the presence of copper implements points to the eventual development of Copper Inuit. He estimates occupation of the Bloody Falls site to be approximately AD 1200-1600 (1972:21-39).

Intermediate Interval: McGhee constructs the Intermediate Interval, and places into it those sites which do not fit classic Thule *or* historic Copper Inuit models. Common characteristic of these sites includes the scarcity of material culture and food bone refuse, rendering chronological dating very difficult. The Intermediate Interval is illustrated by the three Kuujjua River sites: Nichol, Buliard, and Tardy. All three sites are located near the mouth of the Kuujjua River. Heavy, semi-subterranean qarmat-style tent rings characterize this site. McGhee speculates that none of the sites appear to be winter occupations; perhaps they were occupied only before the movement into snow houses or onto sea ice. All sites are well located for coastal sealing in the spring. He estimates occupation at AD 1600-1771, allowing some overlap of Thule and Copper Inuit to allow for the "transition" between cultures (1972:39-100).

Historic Period: McGhee defines the Historic Period as commencing with Hearne's initial contact at Bloody Falls in 1771 until the time when European trade goods were readily available, circa 1857. This period is represented by the Kunana site near the mouth of the Kuuk River in Prince Albert Sound. At the time of McGhee's analysis, this was the only definitely identifiable Copper Inuit site. At the Kunana site, occupants placed a strong emphasis on fishing and caribou hunting. Caribou constituted ninety-six percent of all faunal remains recovered.

Most artifacts recovered from the historic period sites are identical to those in ethnographic collections. Stylistically, artifacts have less decoration, but still retain Thule characteristics. McGhee (1972:100-102)proposes that the similarity is indicative of a close relationship between the inhabitants of the Kunana site and twentieth century

Copper Eskimo. Trade goods present at Kunana all match standard British Naval expedition supplies. Occupation of this site is estimated at late 19th century.

McGhee notes that during the three time periods involved, no distinctively new house style evolved. Instead, as the function changed, house styles changed. The Thule winter house became the qarmat, which disappeared during the Historic period. The snow house then became the most important dwelling. From his analysis of the available data, McGhee concludes the following:

> 1. The ancestors of the Copper Inuit were Thule who migrated to the Coronation Gulf area approximately 1000 years ago.
>
> 2. The initial eastward movement of the Thule culture resulted from an expansion into an eco-zone to which they were adapted. A later distinct variant developed in response to local conditions.
>
> 3. The Neo-Boreal cooling caused many Thule characteristics to go out of style, producing the most major changes from Thule to Copper.
>
> 4. Although the Copper Inuit developed in relative isolation, they experienced periodic influence from other Eskimo groups, especially from the west.
>
> 5. Europeans indirectly influenced the final stages of development of Copper Inuit culture during the 19th century (McGhee 1972:130).

From 1979 to 1981, D. Morrison (1983) conducted intensive archaeological investigations in the Western Coronation Gulf area, excavating three Thule house sites: the Clachan (NaPi-2), Nuvuk (NcPr-1), and Beulah (NcPf-12). Primary research goals addressed the issues of Thule culture history within the Western Coronation Gulf area, stylistic periodization of artifacts, the relationship to Thule culture in other areas, and the possibility of identifying a local variant of Thule culture in the Western Coronation Gulf area. Secondary goals included investigations of subsistence patterns (Morrison 1983:42). Morrison determined that between AD 1150 and 1450 people living in this area possessed a variant of Thule Inuit culture originating in Alaska.

His conclusions center on the three sites of the project, along with the Bloody Falls and Lady Franklin Point sites. These sites appear to encompass the entire Thule occupation of the area. Thule culture in the Western Coronation Gulf area is most closely related to Western Thule from Alaska and the Mackenzie Delta, with similarities most visible in pottery styles. Morrison feels that the "local Thule culture" is of directly western origin, rather than a secondary expansion of Eastern Thule culture (Morrison

1983:223-224). He also feels that the Coronation Gulf area maintained close contacts to the west, and was involved in the west/east flow of trade goods, ideas, and peoples. Morrison suggests that by AD 1400 the Western Coronation Gulf area served as a bridge for movement of eastern stylistic innovations to the west.

Morrison (1983:225-229) suggests that the abandonment of the area between Stapylton Bay and Cape Bathurst prior to Historic times resulted in the breakdown of contacts between the eastern and western areas of the arctic. He also notes that the use of copper seems to have developed prior to the development of the Clachan harpoon head types which do not appear until mid-way through the occupation of the site.

Morrison (1983:230-243) provides an in-depth discussion of the faunal remains from the three sites, noting the existence of few subsistence studies outside of describing a Thule reliance upon sea mammals, particularly whales. Large quantities of faunal materials were recovered from the Clachan, Nuvuk, and Beulah sites ranging from ringed seal and caribou to fish, birds, bear, bowhead whale, moose, ground squirrel, and hare.

Morrison notes that all sites are characterized by high ringed seal frequencies and secondary reliance upon fox and caribou. Assemblages from all three sites are distinctive in that there were no remains of walrus. Morrison notes the lack of evidence of bowhead whale hunting or of other large sea mammals, suggesting their probable absence from the region, as they are not hunted today in the area. Morrison also constructs an historical analogy of subsistence, suggesting that the sites were primarily occupied during winter months with subsequent summer occupations, and caching of summer-killed foods (Morrison 1983:243-246).

Morrison concludes that some sites were situated to take advantage of caribou migrations, and also of areas where freeze-up is late and break-up is early. Individuals living at sites located in late freeze areas were highly dependent on ringed seal. Primary seal hunting strategies included ice-lead and boat hunting. Morrison suggests that the Thule in Coronation Gulf lacked skills and technology necessary for breathing-hole sealing.

Thule sea mammal hunting reflects techniques developed in the Western Arctic. Morrison observes a "truly Neoeskimo pattern, based on permanent winter settlements and the open-water and ice-edge hunting of sea mammals" (1983:277). Morrison notes that the transition from Thule to the historic culture in Coronation Gulf was very traumatic, and attributes the lack of Intermediate Interval sites to a sharp population decline. As a result, by historic times, Neoeskimo traits had disappeared.

As a final point, Morrison (1983:207-279) suggests a revision of McGhee's theory that the Thule decline in the Western Central Arctic resulted from the Little Ice Age

(Neo-Boreal cooling) decimating seal and caribou populations. As a direct consequence of decimated caribou and seal populations, Morrison proposes that local populations were forced to rely heavily on stored foods. Under continued strain, rapid socioeconomic change and starvation occurred. Populations aggregated on the frozen ice and began practicing breathing-hole sealing. Architectural styles altered, with winter houses evolving into *qarmat* style dwellings. Eventually the *qarmat* was abandoned in favor of snow houses. Morrison urges continued research on Thule subsistence strategies in the New World arctic.

Morrison also conducted excavations at Iglulualuit during the field season of 1987 (1990). Research goals focused on the analysis of archaeological materials from South Amundsen Gulf, an area that is one of two possible routes by which Thule cultures entered Arctic Canada from Alaska. Morrison excavated two sod and wood winter houses, and also analyzed materials from Franklin Bay near the mouth of the Horton River. He also examined materials collected by Stefansson and his men during the Canadian Arctic Expedition (1913-1916) from Langton Bay and Okat in Amundsen Gulf, and Booth Island.

Morrison (1990) offers detailed discussions of artifacts from each site, attempting to place them within a temporal and cultural framework. He also offers several suggestions regarding the occupations of each site and subsequent abandonment of the area. Morrison (1990:98) feels that the Booth Island material is likely western Thule. The artifacts show a distinct variant of Thule culture known as the Clachan phase, and share characteristics of Western Arctic material. Booth Island is distinctive from Clachan in that it contains no copper tools. Morrison (1990:99) suggests that Booth Island dates to approximately AD 1350-1400.

Morrison (1990:107) suggests that during the early 15th century, the Iglulualumiut replaced Thule peoples in Franklin Bay, which is visible in the shift from open socket to closed socket harpoon head types. Similarities between artifacts are explained by possible trade or population movements during periods of demographic stress. Morrison suggests (1990:111) that Iglulualumiut culture developed from a pre-existing local Thule culture.

Morrison (1990) proposes the abandonment of Amundsen Gulf between AD 1400-1450. He suggests that abandonment coinciding with the Neo-Boreal period, resulting in cooler summers and multi-year sea-ice, providing adverse conditions for sea mammals. With the general depopulation of Amundsen Gulf during the 15th century, continuous occupation along the coast probably ceased, possibly aiding the development of distinct regional Inuit cultures. Various changes occurred across the Arctic, with the

Copper Inuit experiencing the most radical changes. Open water sealing and permanent sod-wood houses disappeared from use.

Morrison (1990:117) estimates the Iglulualumiut population at 200-500, but suggests that by the end of the mid-19th century this number was drastically reduced, offering starvation and disease as possible explanations. The south coast of Amundsen Gulf was abandoned by mid-19th century, probably between 1835 and 1845. Morrison also suggests that the Igluluamiut moved west to Baillie Island in order to obtain Russian trade goods from Alaskan Iñupiat, and that abandonment indirectly resulted from European contact (1990:111-119). Morrison's conclusions remain greatly debated and open for further investigations.

C. Arnold (1981) conducted excavations at the Lagoon Site on Banks Island, N.W.T. during the summers of 1976 and 1977. The project aimed to investigate the history of occupation on southern Banks Island, and to obtain data that would aid in addressing questions of interactions across cultural boundaries (Arnold 1981:2).

Arnold attempts to place the Lagoon site within an historical framework, suggesting that the site fills the void between the latest Pre-Dorset and earliest Dorset sequence at Ekalluk River (a period of approximately 400-500 years) (Arnold 1981:25). The Lagoon Site is located on Banks Island, approximately three kilometers southeast of Masik river mouth. Erosion has reduced the site by an unknown degree. Arnold divided the site into three areas for excavation (Arnold 1981:26-30).

Faunal remains from the Lagoon Site consisted primarily of snow goose and ptarmigan. Eggshell fragments were also recovered from the site. Ringed seal constituted the most common mammalian species, with 40% of the ringed seal specimens being immature. Six muskox skulls as well as appendicular elements were recovered. Arnold (1981:113) notes evidence for marrow extraction and possibly bone grease production. Very few caribou remains were present at the site, but a high frequency of fox was present. Arnold notes that fox were known to be utilized when caribou are scarce or absent.

Arnold estimates that the site's occupation is within the range of mid-March to mid-September. Evidence to support this hypothesis includes the presence of medullary bone in waterfowl species. Arnold comments "medullary bone could be expected to be present in the skeletons of reproductively active female snow geese from mid-May until the end of June" (Arnold 1981:117). Muskox dentition also indicates spring/summer kills of 3 and 4-year old animals. High proportions of juvenile ringed seal point to late spring or early summer site occupation (Arnold 1981:120).

Arnold suggests that Area A was a brief seasonal occupation used over a number of years, with homogeneity of artifacts indicating the same cultural complex. Activities at the site include stone tool production, hide preparation/sewing, food procurement, and carcass processing. Terrestrial, avian, and marine resources were all heavily utilized. The degree of muskox skeletal reduction at the site is a possible indication of a heavy reliance upon the species for subsistence (Arnold 1981:124). Faunal materials indicate a late spring or early summer occupation. However, lamps and a high frequency of seal bones indicate a fall or winter occupation as well. Fetal seal bones provide evidence for late winter hunting. Arnold suggests either a late winter/early spring move from inland to the coast, or wintering on the sea ice with a spring movement to this site (1981:126).

Arnold uses radiocarbon dating techniques and cultural comparisons to assign dates to the Lagoon site. Radiocarbon testing yielded uncorrected dates of an average 388 BC. Arnold suggests that the dates may be contaminated, and that the dates presented represent the upper limits for the occupation (Arnold 1981:127).

Arnold summarizes probable implications of the data presented. He notes that the study attempts to establish the Lagoon Site as a late Pre-Dorset variant developing in the Western Canadian Arctic and having cross-cultural interactions with Dorset peoples to the east and Norton-like cultures west of the Mackenzie Delta. Unlike peoples of Late Pre-Dorset or Barrens cultures, Lagoon site inhabitants relied less heavily upon terrestrial hunting activities. These people must have developed adaptations to a variety of resource situations (Arnold 1981:176). Faunal remains from the Lagoon site indicates that the resource distribution on southern Banks Island during the occupation differs very little from that of today (Arnold 1981:178). Arnold also notes that a cooling trend beginning approximately 500 BC possibly caused fluctuations in populations of the Barren Ground caribou herds, and could be responsible for the disappearance of the Pre-Dorset cultures dependent upon the caribou. He states that the availability and stability of resources elsewhere on the western periphery of the Canadian Arctic likely permitted the persistence of Pre-Dorset enclaves until the period of Dorset and Norton expansion into the area (Arnold 1981:178).

Arnold concludes discussions of the Lagoon site by noting that Paleoeskimo complexes from the two cultural developmental spheres of Alaska and the Eastern Arctic existed not in isolation, but rather maintained contact with each other. He suggests that possibly the connections between arctic Alaska and Canada may be found. Arnold further suggests that the Lagoon Site provides evidence for hypothesizing about the continuity of Pre-Dorset and cross-cultural interactions (Arnold 1981:185-187).

Hickey (1984) addresses changes to society and culture of the Copper Inuit during the latter half of the 19th century. He points out a common misconception that since the Copper Inuit remained undescribed by trained ethnographers until the early 20th century, they were considered "untouched" by European influence. Hickey argues against this view, and investigates factors contributing to the alteration of Copper Inuit culture into that observed by ethnographers.

A suggestion as the primary "cause" of change is the attempts by the British Royal Navy to locate a northwest passage from the Atlantic to the Pacific Oceans. The famous Franklin voyage which sailed in 1845 looking for the Northwest Passage never returned. Various ships searched unsuccessfully for the Franklin Expedition. One of them, the *H.M.S. Investigator*, while searching for Franklin's expedition, became trapped in sea ice, and was abandoned in Mercy Bay on northern Banks Island. Stores aboard the ship were transferred to shore at Mercy Bay and cached. Hickey suggests that the Copper Inuit weren't long in finding the cache, either through previous contact with Europeans or by "frontier scanning", a common behavior of scanning territory near normal hunting territories for game. Hickey assumes, then, that even though the interior of Banks Island was uninhabited, the Copper Inuit were knowledgeable of it (1984:18).

From the knowledge that literally tons of raw materials were introduced into the Copper Inuit economy, Hickey proposes two questions:

1. What were the effects of these exotic materials on such a small scale economy?
2. Would investigations of question one shed light on unique characteristics of Copper Inuit culture? (1984:20).

According to Hickey, many sites lack numerous diagnostic artifacts owing to their nature as being (a) very temporary sites indicative of transience, or (b) animal kill and butchery sites. However, some sites do contain numerous artifacts, and these are interpreted as being repeatedly occupied base camps. In some of these sites vast quantities of muskoxen remains were identified, indicating its importance in the diet.

He (1984:24) proposes a cause/effect relationship after contact between the influx of European goods and the unique characteristics of Copper Inuit culture, offering two points for consideration. (1) For approximately thirty years exotic goods circulated into Copper Inuit society. These goods were widely dispersed through trade during winter congregations, and the source was also widely known. (2) Also, the flow of exotic goods was essentially one way. Approximately only 10-20% of the population had direct access to the depot.

Hickey follows two assumptions (based on present-day observations) that: (1) Copper Inuit were very egalitarian; and (2) exchange was based on mutual reciprocity. General or delayed reciprocity was inversely related to the degree of relationship of the parties involved (Hickey 1984:25). These assumptions led Hickey to question how the Inuit might relieve the structural strain on annual exchanges of unequal value, and he suggests two possible solutions: (1) social relationships may be shifted into those of "gift-givers" and "gift receivers"; (2) a procurement of greater quantities of traditionally valuable materials, essentially increasing production and thus increasing goods in circulation. Hickey also suggests that on an individual level, people might relieve strain by entering into closer kin relationships, and by establishing exchange relationships which allowed debts to be deferred.

The increase of traditionally valuable goods which are all land based is an important point. All individuals may claim equal access to marine resources, which therefore do not have a 'scarcity value'. However all individuals did not have the same access to the *Investigator* depot or other land resources. This distinction probably arises from seasonal fluctuations in Copper Inuit social organization. During winter months, the Copper Inuit traditionally congregated on the sea ice in large snow house villages. Cooperative hunting efforts for breathing-hole sealing greatly increased the entire group's chances for survival through the harsh winter. In the spring, when the sea ice began to melt, the Copper traditionally moved back onto the land, and split into small groups consisting of nuclear families or extended families. Each group moved to a territory which they regularly exploited. Territories tended to remain constant for individuals, with fluctuations occurring when game or fish were scarce. The Investigator's cache was located in an extension of the summer hunting territory of the Kanghiryuarmiut and the Kanghiryuachiakmiut, the most northeasterly of the Copper Inuit, who regularly "mined" the cache and introduced the exotic materials into the economy during winter congregations. It is likely that people terminated spring sealing earlier in order to obtain more high-status land goods, despite the fact that sealing would likely have provided a more reliable subsistence base (1984:25). Furthermore, it would have been such land-based resources as caribou that the Mercy Bay visitors would have been unable to procure while on Banks Island. Based upon his discussion, Hickey concludes:

> 1. Owing to the influx of European goods there was a greater need for high-status land-based items. This led to a sharp increase in the use of native copper just prior to the ethnographic period.
>
> 2. Style in material culture can be a means of conveying visual information, promoting a sense of community within a social group and reinforcing boundaries between groups.

> 3. A period of significant cultural change existed within Copper Inuit culture resulting from the introduction of large but finite amounts of exotic goods. However the directions of those changes resulted from a combination of internal factors already possessed by the Copper Inuit (1984:30).

A point of major importance in Hickey's study lies in the conclusion that Copper Inuit were not unaffected by European contact prior to ethnographic study. They were affected as a result of their utilization of the *Investigator*'s cache at Mercy Bay. Thus we cannot safely consider them as an "uncontaminated" traditional society for study (1984:31).

Of all of the previous studies undertaken in this region, only one attempts to employ utility indices of the sort developed by Binford, and is therefore the most relevant to this study. It, however, focuses on a different species from that considered here.

Will's study (1985) attempts the application of Binford's middle range theory in the investigation of 19th century Copper Inuit resource procurement and the use of muskoxen on Banks Island, N.W.T. (Will 1985:10). Will examines muskoxen remains from three archaeological sites, Haogak (PhPo-3), Nasogaluak (PgPw-3), and Kuptana (PjRa-18). Methodologies involved examination of excavation units and further divisions into activity areas within each site in an attempt to further break down site use into its basic components.

The Haogak site (PhPo-3) is located on a terrace of a small river valley, approximately 3 km from the northern east coast of Banks Island (1985:101). Over 14,000 items were located and mapped at this site. Muskox remains comprised 61% of the total assemblage, and 85.3% of osteological remains. Stone features identified included caches, tent rings, and stone rows (1985:105). Based upon excavated floors in some tent rings, suggestive of cold traps, Will concludes that Haogak represents a fall occupation. Analysis of dental annuli of muskoxen indicate fall kills (1985:142). Sexing of muskox skulls revealed a sex ratio approaching the 1:1 ratio expected for fall herd congregations. Will suggests that this site probably functioned as a kill site and a processing area. Skulls and articulated vertebrae are present, as well as long bones broken for marrow almost without exception. Will further examines concentrations of bone and refuse within the site, and attempts to determine the types of activities conducted there. He utilizes Binford's models in these endeavors, and discusses expected results (1985:154-170).

Nasogaluak (PgPw-3), located above the east bank of the Thomsen River approximately 70 km south of Kuptana and 90 km west of the Haogak site (Will 1985:107), is situated on a prominent bluff with a good view of the Thomsen River

Valley. Two major concentrations of features are identified at this site: one near the bluff, and one several hundred meters to the east. Approximately 11,000 items were located and mapped, with muskox remains constituting 58% of the total assemblage, and 90.6% of the total faunal inventory (Will 1985:109). Stone features numbering approximately 100 were identified, including tent rings, vault and dismantled caches, "qarmat-like structures," wind breaks and flagstone-paved areas (Will 1985:109-111).

Based upon analysis of dental annuli, Will determined that spring and summer procurement of muskox occurred at Haogak. Owing to flat exposed terrain, animals were probably more difficult to hunt. Bones of very young muskox were present; whereas no immature muskoxen were present at Haogak (Will 1985:171). Will suggests that the site was an area of secondary processing: only five skulls were identified at the site. All long bones, except those of very young calves, were processed for marrow. Will proposes that this extensive processing in the spring when animals are in poor nutritional condition reflects the lack of other marrow and grease sources (Will 1985:175).

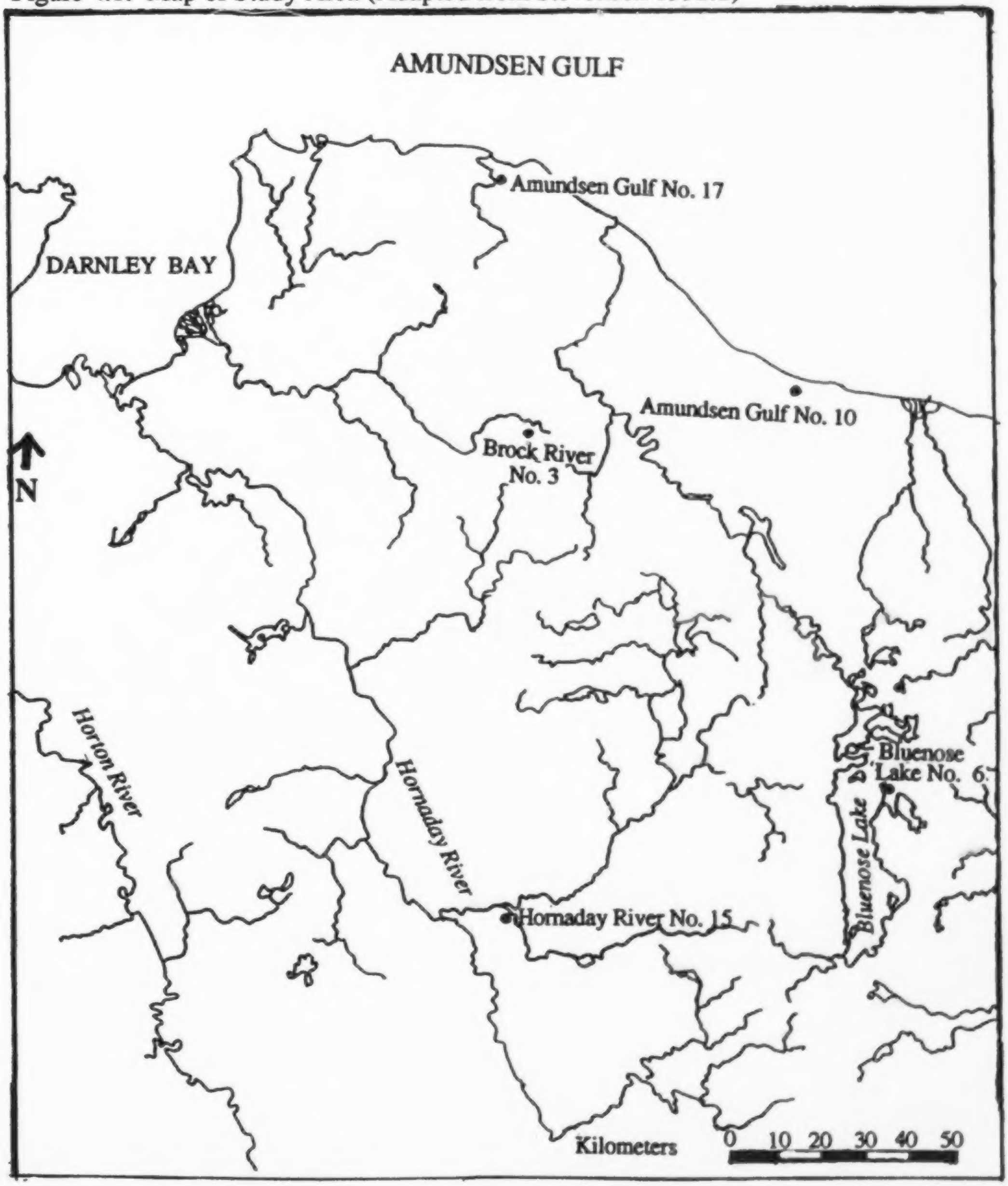
The Kuptana site (PjRa-18) is located approximately 60 km south of Mercy Bay in the Thomsen River drainage (Will 1985:111). The site covers approximately 20,000 square meters, and has sandstone outcroppings at both the north and south ends. One-hundred twenty vault caches were recorded at this site (Will 1985:113). Other features recorded at this site include approximately 35 stone tent rings, and circles of muskox ribs "stuck upright into the ground". Presumably these were used for stretching and drying skins (1985:115, 117). Approximately 36,500 artifacts, stones and faunal materials were recorded and mapped. Muskox bones comprised 83.4% of the faunal sample and 70% of the total assemblage. Analysis of dental annuli led Will to conclude that the Kuptana site was used during the spring, summer, and fall: presence of very young muskox remains suggest a spring occupation. Ratios of axial to appendicular elements suggest that Kuptana represents probably both a kill and processing site very similar to Haogak. Will noted that once again hunting may have occurred in the late summer/early fall, when it is possible to drive entire herds into areas near the site (Will 1985:192-193). Faunal remains indicate that large numbers of animals were processed at this site.
Will (1985:198) proposes grease production was similar to that of the two previous sites.

Previously I discussed the utility indices developed by Lyman et al for seals. It was decided that application of this meat utility index would not be used within the framework of this study for two reasons. First, it seems to have obvious methodological flaws (discussed above) which would possibly yield erroneous results. Second, the assemblage for the Amundsen Gulf site, while composed almost entirely of seal, contains only eight bones (7 ribs and 1 ulna) which are applicable to the index. All other elements (40) are flipper bones, and are not evaluated in the meat utility index.

Chapter 4. Site Descriptions and Data Presentation

I shall now consider the main data base of this study. This chapter will summarize Stevenson's work (1992) and present his conclusions regarding the sites and components. Information concerning the recovered faunal data to be studied will be presented in an effort to reconstruct prehistoric life in the general Bluenose Lake region of the western Northwest Territories.

Figure 4.1. Map of Study Area (Adapted from Stevenson 1992:2)


AMUNDSEN GULF
DARNLEY BAY
Amundsen Gulf No. 17
Amundsen Gulf No. 10
Brock River No. 3
N
Horton River
Hornaday River
Bluenose Lake No. 6
Bluenose Lake
Hornaday River No. 15
Kilometers
0 10 20 30 40 50

While in-depth discussions of element counting methods are provided later in this thesis, I feel that it is necessary to preface the summaries of Stevenson's 1992 analyses with a preliminary introduction of traditional counting methods. Stevenson uses NISP (Number of Identifiable Species Present) and MNI (Minimum Number of Individual) estimates for determining species abundance. NISPs are simply the number of individual bones which are identifiable to species and element. The NISP is a count of the number of identified bones present in an assemblage. MNI estimates determine the minimum number of individual animals required to provide the number of elements recovered in the faunal assemblage. The reliability of both methods is weakened by their vulnerability to aggregation (Grayson 1984). These methods developed early in the history of archaeology, but were soon followed by more useful ones. Further discussion of methods of element counting are presented below.

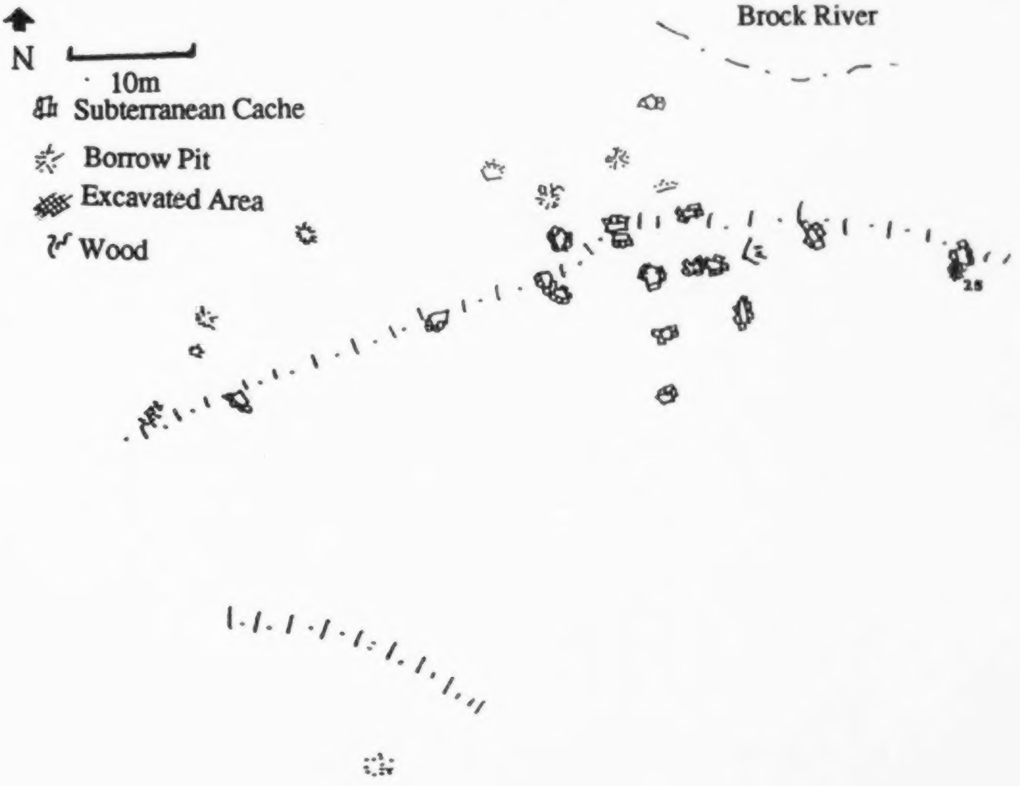
Site Descriptions

The five sites examined in this project were excavated during the summer field season of 1991 by Marc Stevenson, then a graduate student at the University of Alberta. Analysis of artifacts and fauna, as well as detailed site descriptions are included in the final project report submitted to Parks Canada (Stevenson 1992). Laboratory space for artifact and faunal analysis was kindly provided by Dr. Clifford Hickey, Department of Anthropology, University of Alberta. Faunal material was identified by me to species and element where possible, using the zooarchaeological comparative collections of the Department of Anthropology, University of Alberta.

Brock River No. 3 (NiRf-1)

This site is located on the south bank of the Brock River approximately 2 km downstream from an unnamed lake near the headwaters of the Brock River (See Fig. 4.1). Stevenson's previous report (Stevenson 1990) indicated that there were 24 subterranean caches, some unopened. Further investigations in 1991 identified these features not as collapsed caches, but as borrow areas from which rock had been removed for constructing caches. Investigations of these borrow areas failed to reveal their contents. Cultural remains recovered within the vicinity of the excavations were limited to pieces of worked driftwood-possibly digging sticks. A five square meter excavation in the eastern area of the site yielded a faunal assemblage composed of fish, goose, and caribou bone (Stevenson 1992:121). Stevenson (1992:123) reports that the artifacts and faunal materials recovered from the excavations probably do not originate there, but are rather associated with an earlier occupation of the area. He suggests that stones utilized for the construction of dwellings were later re-used to construct the subterranean caches. No architectural features remain at the site except a possible tent ring of heavy, subrectangular construction observed west of the caches. Artifacts recovered included worked pieces of bone and a probable knife handle. Stevenson suggests that the artifacts from this site indicate that the site was first occupied by Thule/Mackenzie Inuit (Stevenson 1992:123).

Figure 4.2. Map of Brock River No. 3 Site (Adapted from Stevenson 1992:122)



Faunal remains recovered from NiRf-1 provide clues to the original contents of the caches and the season of exploitation. Stevenson notes: "Caribou and goose may have been hunted from, and even stored at, this location. However, fish probably constituted the major contents of most caches" (1992:124). He also suggests that, owing to differential rates of preservation, fish may be under-represented in the faunal assemblage, with trout and char representing 8.06% and 35.48% of the total number of identifiable specimens present, (NISP), respectively. Caribou comprises 12.90% of the total NISP, and seal only 4.84% total NISP. Goose represents 27.42% of total NISP. Fox, unidentified bird, and unidentified fish make up the remaining 11.28% of the total NISP (see Table 4.1). Stevenson states that "Fish may have been even more important in the local diet than its relative percentage compared to other species would indicate" (Stevenson 1992:124). Presence of goose and immature caribou bone is suggestive of a late spring occupation. This site likely represents a palimpsest of several seasonal and temporal occupations (Ibid.).

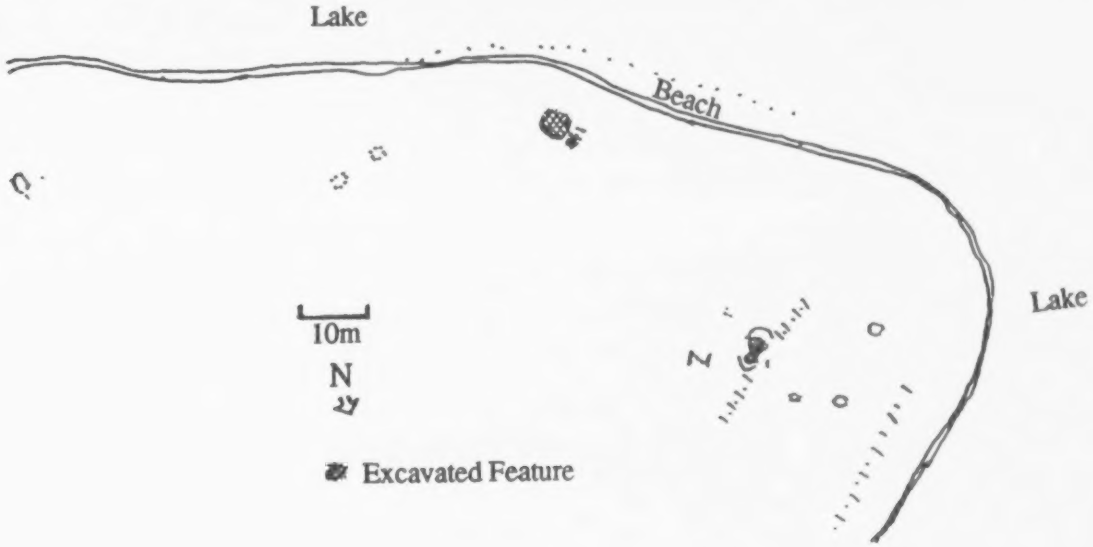
Table 4.1. Brock River No. 3 Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	8	12.90
Seal	3	4.84
Goose	17	27.42
Fox	1	1.61
Trout	5	8.06
Char	22	35.48
Unidentified Bird	5	8.06
Unidentified Fish	1	1.61
Total	62	

Bluenose Lake No. 6 (NcPw-1)

The site is situated on the east side of Bluenose Lake at the mouth of a small stream. Seventeen features, largely tent rings and caches were recorded in 1991. Two primary concentrations of features comprise the site. The first concentration overlooks a small bay. The second concentration, "two tent rings and a double cache", is located on a beach ridge circa 150-200 m north (Stevenson 1992:125-6). Architectural features at this site include tent rings with very heavy construction. In one case the bilobate rings have disproportionately-sized lobes, suggestive of Thule/Mackenzie Inuit construction. Stevenson also identified elongated tent rings which were more recently constructed. Artifacts recovered were not numerous, and consist of bifacially flaked choppers, stone knives including an ulu, bone knife handles, ground and chipped points/endblades, gouges, awls, fragments of native copper, and large bifacially modified flat rocks, possibly used as serving trays.

Figure 4.3. Map of Bluenose Lake No. 6 Site (Adapted from Stevenson 1992:126)



Stevenson's investigations at NcPw-1 led him to conclude that there were at least three separate occupational components. Features 1 and 15 suggest a Thule/Mackenzie Inuit occupation, while Features 2 and 3 probably represent a later occupation by Copper Inuit. Occupation was by (1) late Prehistoric Thule Inuit, (2) Mackenzie Inuit, and (3) historic Copper Inuit. All components indicate occupation during the spring, as evidenced by the presence of fetal caribou (Stevenson 1992:125-30).

Faunal remains from the Bluenose Lake 6 site include a predominance of caribou bone (76.92% of total NISP). Seal and ground squirrel account for 2.88% and 4.81% of total NISP respectively. Trout, char, loon, muskox, and duck combined comprise 11.53% of total NISP. Unidentifiable bird and fish constitute the remaining 3.84% of NISP (see Table 4.2).

Faunal remains from Feature 1, the first occupation at Bluenose Lake designated by Stevenson, are illustrated in Table 4.3. Caribou constitutes 75% of the Total NISP. Ground squirrel accounts for 12.5% of the total NISP, with trout and unidentified rodent each comprising 6.25% of the total NISP.

Table 4.2. Bluenose Lake No.6 Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	160	76.92
Seal	6	2.88
Ground Squirrel	10	4.81
Trout	2	.96
Char	16	7.69
Loon	2	.96
Muskox	2	.96
Duck	2	.96
Unidentified Bird	3	1.44
Unidentified Fish	5	2.40
Total	208	

Table 4.3. Bluenose Lake No. 6, Feature 1, First Component Designated by Stevenson: Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	12	75
Ground squirrel	2	12.5
Trout	1	6.25
Unidentified Rodent	1	6.25
Total	16	

Table 4.4 illustrates faunal remains by species for Feature 15, the second occupational division at Bluenose Lake designated by Stevenson. Caribou represents 64.37% of the total NISP. Ground squirrel makes up 8.05% of the total NISP, while trout composes another 25.25% total NISP. Seal and duck each account for 1.15% of the total NISP for this occupation.

The remaining features at the Bluenose Lake site comprise the third occupation division suggested by Stevenson. Table 4.5 illustrates the faunal remains by species. Caribou constitutes 92% of the total NISP. Unidentified bird makes up 3% of the total NISP. Muskox and loon each comprise 2% of the total NISP, while ground squirrel makes up the remaining 1% of the total NISP.

Table 4.4. Bluenose Lake No. 6 Feature 15, Second Component Designated by Stevenson: Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	56	64.37
Seal	1	1.15
Ground squirrel	7	8.05
Duck	1	1.15
Trout	22	25.25
Total	87	

Table 4.5. Bluenose Lake No. 6 All Features Comprising Third Component Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	92	92
Muskox	2	2
Ground squirrel	1	1
Loon	2	2
Unidentified Bird	3	3
Total	100	

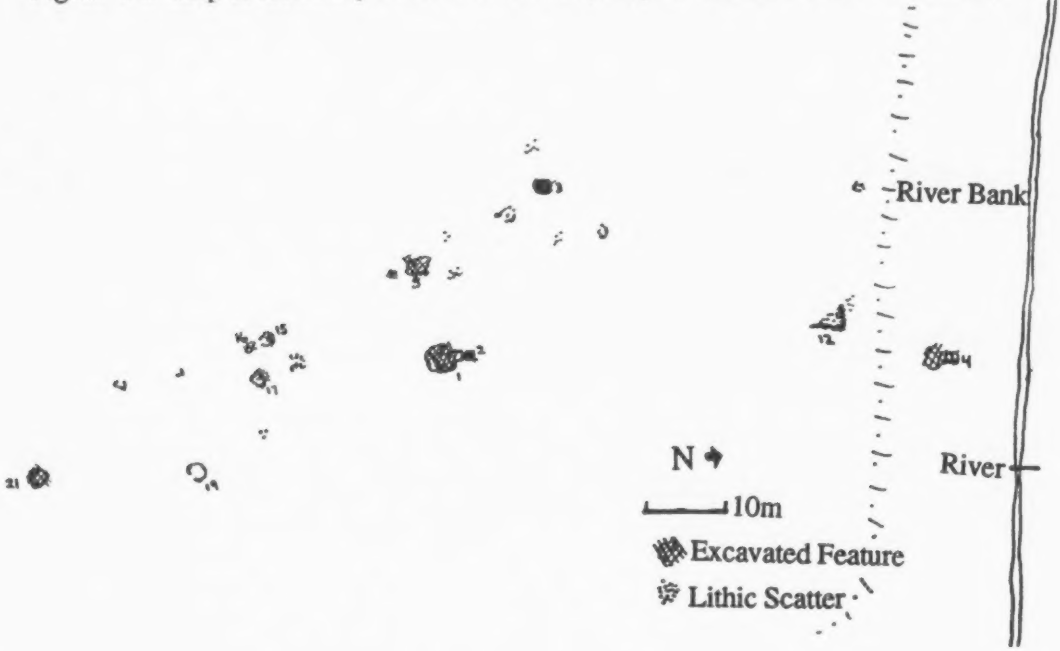
Hornaday River No. 15 (NcRf-1)

This site is located on a tributary of the Hornaday River, approximately 15 km upstream of its confluence with the main branch of the Hornaday River (Stevenson 1992:130). Twenty-two features were recorded in 1991. Four dwellings, two caches, and a hunting blind/windbreak (Features 1, 2, 3, 4, 5, 12, and 21) were subsequently excavated. A brief discussion of the results will be presented; for detailed descriptions of individual features see Stevenson 1992.

Artifacts recovered from this site include bone tools such as arrowheads, ice-pick, an antler flaker, marrow extractor, drilled sled shoe fragments, bone needles, awls and a fish hook barb. Stone tools include flaked and ground stone fragments, ground slate ulus, a flaked basalt arrow point, basalt pre-forms, asymmetrical knife blade, and a triangular arrow point (Stevenson 1992:130-139).

Stevenson suggests that this site was repeatedly occupied by small groups of Thule-Mackenzie Inuit similar to the late prehistoric occupants of Franklin Bay and Okat. He separates the occupations into three different periods. The first occupational component includes Features 1, 2, 3, 5, 12, and 21. Component two consists of Feature 4, and the third component is comprised of Features 15, 17, and 19. Stevenson utilizes, where possible, diagnostic artifacts to assign cultural affiliation to the components. Architectural features are used in the absence of, or in conjunction with, artifacts to support his conclusions concerning cultural affiliation.

Figure 4.4. Map of Hornaday River No. 15 Site (Adapted from Stevenson 1992:130)



Faunal remains from the Hornaday River site consist primarily of caribou, which comprise 93.52% of the total NISP. Ground squirrel accounted for 4.94% of the total NISP, with fox, loon, and muskox composing the remaining 1.55% of NISP (see Table 4.6). Relatively large proportions of fetal and very young subadult caribou bones recovered from Features 1 and 2 suggest an occupation during or near the calving season of mid-May to late June (Stevenson 1992:133). An absence of infant caribou remains, along with a high presence of adult, subadult caribou, and ground squirrel elements at Feature 4 suggests a late summer/early fall occupation.

Table 4.6. Hornaday River No. 15 Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	303	93.52
Ground Squirrel	16	4.94
Fox	3	0.93
Loon	1	0.31
Muskox	1	0.31
Total	324	

Stevenson (1992:139) suggests that Component One likely represents a spring occupation, with ice fishing supplementing the interception of northward migrating caribou. Radiocarbon dates of AD 1820+/-70 lead Stevenson to suggest an occupation by Mackenzie Inuit in the late 18th and early 19th centuries.

Faunal remains from the first component at the Hornaday site suggested by Stevenson (Features 1, 2, 3, 5, 12, and 21) are illustrated in Table 4.7. Caribou comprises 93.52% of the total NISP. For this component, ground squirrel accounts for 4.94% of the total NISP. Fox makes up .93% of the total NISP, with loon and muskox each representing .31% of the total NISP.

Table 4.7. Hornaday River No. 15, First Component as Designated by Stevenson: Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	202	92.66
Muskox	1	0.46
Ground squirrel	11	5.05
Loon	1	0.46
Fox	3	1.38
Total	218	

The second occupation is represented by Feature 4, which is a semi-subterranean dwelling. Stevenson suggests that this structure was occupied in the fall or early winter by a single Thule/Mackenzie Inuit family. Caribou comprises 95.28% of the total NISP, with ground squirrel accounting for the remaining 4.72% total NISP. Table 4.8 presents the faunal remains by species for Feature 4, the second component designated by Stevenson.

Table 4.8. Hornaday River No. 15, Feature 4, Second Component Designated by Stevenson: Total Number of Bones by Species.

Species/Category	NISP	% NISP
Caribou	101	95.28
Ground squirrel	5	4.72
Total	106	

The third and final component of this site is represented by three tent rings (Features 15, 17, and 19) and possibly also by Features 8, 9, and 16. Stevenson notes that the light tent ring construction indicates a summer occupation. However, the chipped and ground stone artifacts point to a Thule/Mackenzie Inuit cultural group rather than Copper Inuit (Stevenson 1992:139). No faunal remains were recorded for Features 15, 17, and 19, the third occupation designated by Stevenson; therefore, a faunal analysis was not possible.

Amundsen Gulf No. 10 (NiPx-5)

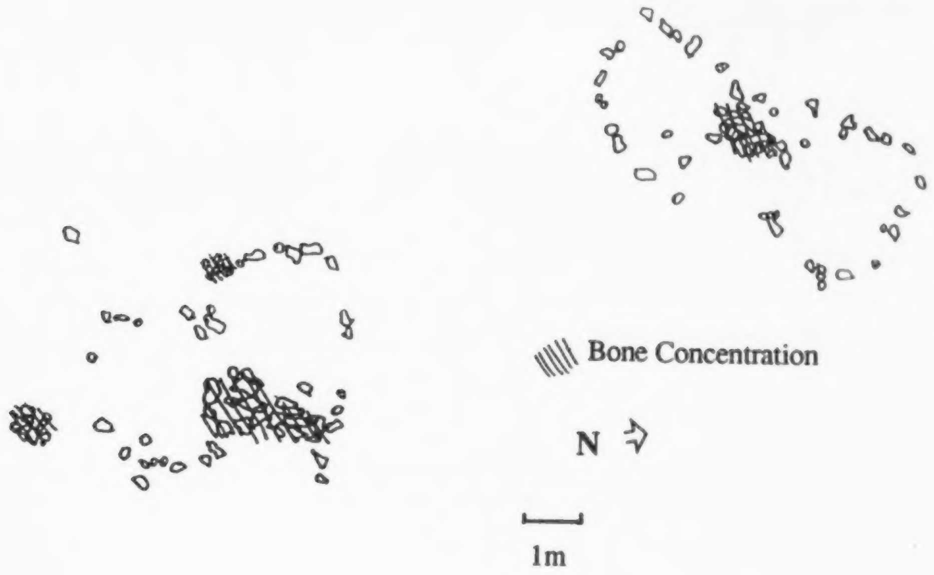
This site is situated on a ridge that overlooks the south coast of Amundsen Gulf. Major features at the site are four cache/grave features and two bilobate tent rings of light construction with central paving stones. No diagnostic artifacts were recovered. In fact, the sole representations of material culture found were a piece of rectangularly shaped wood and what appeared to be a broken ceramic rimsherd. However, quantities of wood charcoal were recovered in association with charred seal bones. As the charcoal and seal bone were collected from the area of the paving stones, Stevenson suggests that this was a hearth or cooking area.

Seal remains recovered from this site consist almost exclusively of metacarpals, metatarsals, and phalanges, or flipper elements, and represent 97.95% of the total NISP for the site. Caribou, represented by a single rib, comprises the remaining 2.05% of the total NISP (see Table 4.9).

Table 4.9. Amundsen Gulf No. 10 Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	1	2.05
Seal	48	97.95
Total	49	

Figure 4.5. Map of Amundsen Gulf No. 10 (Adapted from Stevenson 1992:140)



Stevenson suggests two possible interpretations of this site. Judging by the construction of the structures and the weathered state of associated bones, he proposes an occupation by "a small group of Dorset Inuit or perhaps earlier Paleoeskimos" (Stevenson 1992:141). Radiocarbon dates from the wood charcoal yield a much more recent date (AD 1460 +/- 70 and 1610+/-100), (ibid.) making this interpretation somewhat doubtful as it would represent a very late occupation by Dorset peoples; in fact, it would beamong the latest known Dorset sites in the arctic.

Stevenson's alternative interpretation suggests that this site is likely a very early Copper Inuit occupation, and only occupied very briefly. Stevenson refrains from further speculations, stressing that more work in the area is necessary for a definitive interpretation.

Amundsen Gulf No. 17 (NkRh-8)

This site is situated in the Melville foothills approximately 8 km south of the Arctic coast. It is located near a stream which empties into Amundsen Gulf west of House Point (Stevenson 1992:142). During the 1991 field season, 40 features were recorded and mapped. Features at this site included "eight heavily constructed circular to subrectangular rock dwellings."(Ibid). A total of seven structures as well as cache-like features and activity areas were excavated during the 1991 field season. The results of the investigations are briefly discussed in this study. For a detailed description of the excavations of each feature, please see Stevenson 1992.

Artifacts recovered from this site include numerous chipped and ground slate fragments, ground slate knife endblade fragments, ulus, a quartzite arrow point, worked wood fragments, and cut antler (Stevenson 1992:144-152). Faunal remains from the Amundsen Gulf 17 site are composed mainly of caribou elements, comprising 76.4% of the total NISP. Overall sample sizes are fairly small (see Table 4.10).

Figure 4.6. Map of Amundsen Gulf No. 17 (Adapted from Stevenson 1992:143)

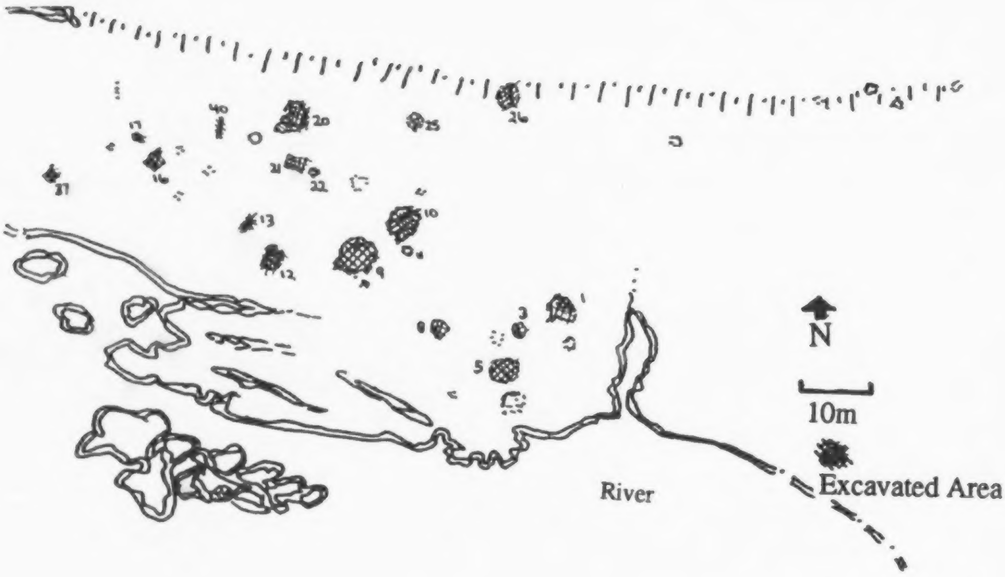


Table 4.10. Amundsen Gulf No. 17 Total Number of Bones by Species

Species/Category	NISP	% NISP
Caribou	68	76.40
Seal	15	16.85
Ground Squirrel	4	4.79
Unidentified Mammal	2	2.25
Total	89	

Stevenson (1992:152) notes that the available information is contradictory with regards to the season of occupation. The presence of bones from large migratory birds and the heavy construction of the dwellings suggests a spring or fall occupation. However, Stevenson suggests a possible fall occupation owing to the predominance of caribou bone. None of the bones recovered included any fetal or subadult elements.

With the abundance of caches and cache-like features, Stevenson (1992:152) states that the function of the site is obvious, but that it is the season of occupation that is in question. He concludes that the site was probably occupied from the early summer until caribou were no longer available in the fall. The large number of the dwellings is attributed to repeated annual occupations perhaps by the same families; it was more efficient to build new structures than to re-use the old ones every year.

Radiocarbon dates of AD 1720+/-150 and AD 1660+/- 270 years BP suggest occupation prior to 1700, probably by prehistoric Mackenzie Inuit (Stevenson 1992:54). Stevenson (1992:152-54) suggests that this site may be contemporaneous with Okat, Langton Bay, and Iglulualuit.

Caribou Element Distribution

The following is a brief discussion of the kinds of skeletal element counting methods currently popular in zooarchaeological research, along with statements relating them to each other and providing some evaluations. These element counting methods are illustrated in Tables 4.11 through 4.21 with faunal data from the above-described sites. While all of the counting methods have been utilized with varying degrees of success by previous researchers, each of the methods has its weaknesses. Ringrose (1992) provides an excellent critique of the strengths and weaknesses of the counting methods and their subsequent uses in statistical analyses. He suggests a standardization of methods of obtaining element counts and offers more suitable applications of statistical analysis to the element count data. Despite his obvious reservations regarding several of the counting methods applied in this study, I chose to use them anyway in an effort to maintain comparability with other researchers studying carcass utility.

NISP

The NISP is obtained by counting all fragments identifiable to species and element levels yielded the Number of Identifiable Skeletal elements Present (NISP). This counting method provides the actual number of elements in the assemblage which are identifiable by the researcher. The NISP is simply a count of numbers of bone fragments. As such, it reflects fragmentation by human, or natural, means which tends to inflate the NISP counts (Grayson 1984). Calculations of %NISP reduces such disparities and more closely reflects actual element occurrences. Discrepancies between caribou total NISP in this study and those originally presented in Stevenson (1992) are the result of the removal of isolated molars and phalanges which could not be identified as to number (e.g. first, second or third molar).

%NISP

The %NISP is obtained by dividing the frequency of each element (NISP) by the total number of the elements identified for all species in the assemblage (the total NISP). The %NISP constitutes a percent frequency, and it provides a statement about the treatment of carcasses at the site such as a possible preference for one part of a carcass over another.

Example: To obtain the %NISP
6 (NISP of ribs)÷68 (total assemblage NISP) = 1.47 %NISP

MNI

NISP and MNI estimates developed early in the history of archaeology as a means of quantifying the abundance of elements in faunal assemblages. As previously noted, NISP counts simply provide the raw number of identifiable elements in an assemblage. A need for more specific means of quantifying faunal assemblages led to the development of the MNI. During the 1950s MNI estimates were developed by T. E. White in an effort to determine the amount of usable meat available from the carcasses introduced into sites (White 1953a). This approach was not totally unique in that it had been used for years by paleontologists in quantifying their assemblages. More recently, MNI estimates have been used to determine the numbers of animals introduced into archaeological sites. It is particularly applied to paired elements such as humeri. The

MNI of an element is obtained by counting all of the rights and all of the lefts of an element. The side with the highest frequency (NISP) is then used as the MNI.

Example: Humerus NISP= 9
Right NISP = 5
Left NISP = 4
Humerus MNI = 5

Minimum numbers estimates and Minimum Number of Individuals counts are vulnerable to two sets of problems related to aggregation effects. First, they depend upon where within an assemblage an analyst decides to set boundaries upon counting, and second, they depend upon which anatomical units the analyst decides to group when ascertaining animal units. Larger estimates may be derived from highly portioned assemblages. Both factors are analyst-dependent, and may produce radically different patterning within faunal assemblages (Grayson 1984; Woollett 1991:72). Will (1985:91) notes that different quantifying methods are required by different research problems. The analyst's task is to identify the quantification problem and to apply appropriate counting procedures. In this study, MNI estimates are avoided.

MNE

MNE counts (Minimum Number of Elements) are employed as a means of accurately evaluating original numbers of elements prior to fragmentation. MNE counts are obtained by counting the numbers of different element portions (proximal end, shaft, distal end). The portion with the highest frequency represents the minimum number of elements required to generate that assemblage.

Example: To obtain the MNE of a Radius
Radius--NISP = 7
Prox.-- NISP = 6
Dist.--NISP = 1
MNE = 6

%MNE

The %MNE describes the presence of elements as proportions of the element with the highest frequency. Unlike %NISP, which divides the NISP of an element by the total NISP of the assemblage, %MNE counts are obtained by dividing the MNE of individual elements by the element with the largest NISP.

Example: To obtain the %MNE of a Tibia:
5 (Tibia MNE) ÷ 14 (NISP of third phalanx) = 35.71 %MNE

MAU

MNE counts are generally applied in butchery analyses, when considering elements entering an assemblage. However, MNE counts are weakened by the fact that the comparisons simply reflect frequencies of element occurrences. The natural frequencies of elements in whole carcasses is not addressed. Binford rejected the use of minimum number estimates in subsistence analysis (which calculate the minimum number of individuals required to account for all of the skeletal elements of a species present in the assemblage), and consequently modified the MNI or Minimum Number of Individuals measures to reflect animal utilization in units of animal segments rather than single animal units (Grayson 1984:89). Binford states:

> All MNIs will be calculated by dividing the observed bone count for a given identification unit by the number of bones in the anatomy of a complete animal for that unit" (Binford 1978:70; emphasis in original).

Binford originally called this adjusted measure "Minimum Number of Individuals", but recently the term "Minimum Animal Units" has been applied by Binford (1984:51). To obtain MAU counts (Minimum number of Animal Units) the MNE of an element is divided by its frequency in a whole skeleton.

Example: To obtain the MAU of a Radius
6 (Radius MNE) ÷ 2 (Frequency of Radius) = 3 MAU

%MAU

To obtain the %MAU, the MAU of an element is divided by the largest MAU in the assemblage. The %MAU describes the MAU as a proportion of the Minimum Animal Unit with the highest frequency. Woollett (1991:71-72) notes that by controlling the natural component of occurrence, it is possible to address more directly patterns of element selection in butchery and processing. This is especially relevant when comparisons are carried out between species having different anatomical structures, or between species or carcass elements reflecting different treatments.

Example: To obtain the %MAU of a tibia

2.5 (Tibia MAU) ÷ 3.85 (Largest element MAU) = 64.94 %MAU

In Tables 4.11-4.21, caribou element counts are presented for the following sites and occupational components: Brock River No. 3, Bluenose Lake No. 6 (overall and three separate components designated by Stevenson in 1992), Hornaday River No. 15, (overall and with two components designated by Stevenson in 1992), Amundsen Gulf No. 17. Of the above, Features 1 and 12 from Hornaday River No. 15 and Feature 15 from Bluenose Lake No. 6 are analyzed from two perspectives: as components defined by Stevenson; and also as activity-specific areas. Caribou element counts are not provided for Amundsen Gulf No. 10, owing to the presence of only a single caribou rib. A variety of methods were employed, and these counts form the body of data for the following analyses. MNE and MAU counts are provided for both proximal and distal limb ends. Different analytical applications such as utility indices require one or the other of these units; thus both are provided. Without exception all limb bones were fragmentary. Whole bone counts were derived from the articular ends.

Table 4.11. Brock River No. 3: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull						
Mandible						
Hyoid						
Atlas	1	12.5	1	25	1	100
Axis						
Cervical V.						
Thoracic V.						
Lumbar V.						
Ribs	4	50	4	100	0.15	15
Sternum						
Pelvis	1	12.5	1	25	1	100
Sacrum						50
Scapula	1	12.5	1	25	0.5	50
Humerus	1	12.5	1	25	0.5	50
Prox. Humerus			1	25.55	0.5	50
Dist. Humerus						
Radius						
Prox. Radius						
Dist. Radius						
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals						
Metacarpals						
Prox. Metacarpal						
Dist. Metacarpal						
Femur						
Prox. Femur						
Dist. Femur						
Patella						
Tibia						
Prox. Tibia						
Dist. Tibia						
Metatarsal						
Prox. Metatarsal						
Dist. Metatarsal						
Tarsals						
Astragulus						
Calcaneus						
Sesamoid						
First Phalanx						
Second Phalanx						
Third Phalanx						
Long Bone Frags.						
Totals	8					

Table 4.12. Bluenose Lake No. 6: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	10	6.25	2	4.17	2	80
Mandible	9	5.63	3	6.25	1.5	60
Hyoid	4	2.5	3	6.25	1.5	60
Atlas	2	1.25	2	4.17	2	80
Axis	1	0.63	1	2.08	1	40
Cervical V.						
Thoracic V.	2	1.25	2	4.17	0.15	6
Lumbar V.	4	2.5	4	8.33	0.67	26.8
Ribs	48	30	48	100	1.85	74
Sternum						
Pelvis	2	1.25	1	2.08	1	40
Sacrum						
Scapula	5	3.13	3	6.25	1.5	60
Humerus						
Prox. Humerus						
Dist. Humerus						
Radius	3	1.88	2	4.17	1	40
Prox. Radius			2	4.17	1	40
Dist. Radius			1	2.08	0.5	20
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals	4	2.5	4	8.33	0.33	13.2
Metacarpals	1	0.63	1	2.08	0.5	20
Prox. Metacarpal						
Dist. Metacarpal			1	2.08	0.5	20
Femur	1	0.63	1	2.08	0.5	20
Prox. Femur			1	2.08	0.5	20
Dist. Femur						
Patella						
Tibia	5	3.13	5	10.42	2.5	100
Prox. Tibia						
Dist. Tibia			5	10.42	2.5	100
Metatarsal	4	2.5	4	8.33	2	80
Prox. Metatarsal						
Dist. Metatarsal			4	8.33	2	80
Tarsals						
Astragulus	2	1.25	2	4.17	1	40
Calcaneus	2	1.25	2	4.17	1	40
Sesamoid						
First Phalanx	10	6.25	10	20.83	1.25	50
Second Phalanx	15	9.38	15	31.25	1.88	75.2
Third Phalanx	4	2.5	4	8.33	0.5	20
Long Bone Frags.	22					
Totals	160					

Table 4.13. Bluenose Lake No. 6, Feature 1, First component Designated by Stevenson: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull						
Mandible	1	8.33	1	20	0.5	0.65
Hyoid						
Atlas						
Axis						
Cervical V.						
Thoracic V.	1	8.33	1	20	0.77	100
Lumbar V.	2	16.67	1	20	0.33	0.43
Ribs	5	41.67	1	20	0.19	0.25
Sternum						
Pelvis						
Sacrum						
Scapula	1	8.33	1	20	0.5	0.65
Humerus						
Prox. Humerus						
Dist. Humerus						
Radius						
Prox. Radius						
Dist. Radius						
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals						
Metacarpals						
Prox. Metacarpal						
Dist. Metacarpal						
Femur						
Prox. Femur						
Dist. Femur						
Patella						
Tibia						
Prox. Tibia						
Dist. Tibia						
Metatarsal						
Prox. Metatarsal						
Dist. Metatarsal						
Tarsals						
Astragulus						
Calcaneus						
Sesamoid						
First Phalanx	1	8.33	1	20	0.13	16.9
Second Phalanx						
Third Phalanx						
Long Bone Frags.	1					
Totals	12					

Table 4.14. Bluenose Lake No. 6 Feature 15, Tent Ring, and Second Occupation Designated by Stevenson: Caribou Element Count

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	9	16.07	1	4.17	1	33.33
Mandible	6	10.71	6	25	3	100
Hyoid	3	5.36	3	12.5	1.5	50
Atlas						
Axis						
Cervical V.						
Thoracic V.						
Lumbar V.						
Ribs	24	42.86	24	100	0.92	30.67
Sternum						
Pelvis	1	1.79	1	4.17	1	33.33
Sacrum						
Scapula	1	1.79	1	4.17	0.5	16.67
Humerus						
Prox. Humerus						
Dist. Humerus						
Radius	1	1.79	1	4.17	0.5	16.67
Prox. Radius			1	4.17	0.5	16.67
Dist. Radius						
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals	2	3.57	2	8.33	1	33.33
Metacarpals						
Prox. Metacarpal						
Dist. Metacarpal						
Femur						
Prox. Femur						
Dist. Femur						
Patella						
Tibia						
Prox. Tibia						
Dist. Tibia						
Metatarsal	1	1.79	1	4.17	0.5	16.67
Prox. Metatarsal						
Dist. Metatarsal			1	4.17	0.5	16.67
Tarsals						
Astragulus						
Calcaneus	1	1.79	1	4.17	0.5	16.67
Sesamoid						
First Phalanx						
Second Phalanx	1	1.79	1	4.17	0.13	4.17
Third Phalanx						
Long Bone Frags.	6	10.71				
Totals	56					

Table 4.15. Bluenose Lake No. 6, Third Component Designated by Stevenson: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	1	1.11	1	5.26	1	40
Mandible	2	2.22	1	5.26	0.5	20
Hyoid	1	1.11	1	5.26	0.5	20
Atlas	2	2.22	2	10.53	2	80
Axis	1	1.11	1	5.26	1	40
Cervical V.						
Thoracic V.	1	1.11	1	5.26	0.08	3.2
Lumbar V.	2	2.22	2	10.53	0.33	13.2
Ribs	19	21.11	19	100	0.73	29.2
Sternum						
Pelvis	1	1.11	1	5.26	1	40
Sacrum						
Scapula	2	2.22	2	10.53	1	40
Humerus						
Prox. Humerus						
Dist. Humerus						
Radius	4	4.44	3	15.79	1.5	60
Prox. Radius			1	5.26	0.5	20
Dist. Radius			3	15.79	1.5	60
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals	1	1.11	1	5.26	0.08	3.2
Metacarpals	1	1.11	1	5.26	0.5	20
Prox. Metacarpal						
Dist. Metacarpal			1	5.26	0.5	20
Femur	2	2.22	1	5.26	0.5	20
Prox. Femur			1	5.26	0.5	20
Dist. Femur			1	5.26	0.5	20
Patella						
Tibia	7	7.77	5	26.32	2.5	100
Prox. Tibia			2	10.53	1	40
Dist. Tibia			5	26.32	2.5	100
Metatarsal	3	3.33	3	15.79	1.5	60
Prox. Metatarsal						
Dist. Metatarsal			3	15.79	1.5	60
Tarsals						
Astragulus	2	2.22	2	10.53	1	40
Calcaneus	1	1.11	1	5.26	0.5	20
Sesamoid						
First Phalanx	9	10	9	47.37	1.12	44.8
Second Phalanx	14	15.56	14	73.68	1.8	72
Third Phalanx	4	4.44	4	21.05	0.5	20
Long Bone Frags.	10					
Totals	90					

Table 4.16. Hornaday River No. 15: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	17	5.61	2	3.7	2	26.67
Mandible	24	7.92	15	27.78	7.5	100
Hyoid	3	0.99	2	3.7	1	13.33
Atlas	1	0.33	1	1.85	1	13.33
Axis	0	0	0	0	0	0
Cervical V.	5	1.65	5	9.26	1	13.33
Thoracic V.	7	2.31	5	9.26	0.38	5.07
Lumbar V.	0	0	0	0	0	0
Ribs	54	17.82	54	100	2.08	27.73
Sternum	4	1.32	4	7.41	4	53.33
Pelvis	4	1.32	3	5.56	3	40
Sacrum	0	0	0	0	0	0
Scapula	12	3.96	7	12.96	3.5	46.67
Humerus	9	2.97	8	14.81	4	53.33
Prox. Humerus			8	14.81	4	53.33
Dist. Humerus			1	1.85	0.5	6.67
Radius	9	2.97	5	9.26	2.5	33.33
Prox. Radius			5	9.26	2.5	33.33
Dist. Radius			4	7.41	2	26.67
Ulna	1	0.33	1	1.85	0.5	6.67
Prox. Ulna			1	1.85	0.5	6.67
Dist. Ulna			0	0	0	0
Carpals	6	1.98	6	11.11	0.5	6.67
Metacarpals	6	1.98	4	7.41	3	40
Prox. Metacarpal			2	3.7	1	13.33
Dist. Metacarpal			4	7.41	2	26.67
Femur	2	0.66	1	1.85	0.5	6.67
Prox. Femur			1	1.85	0.5	6.67
Dist. Femur			1	1.85	0.5	6.67
Patella	1	0.33	1	1.85	0.5	6.67
Tibia	5	1.65	3	5.56	1.5	20
Prox. Tibia			3	5.56	1.5	20
Dist. Tibia			2	3.7	1	13.33
Metatarsal	10	3.3	6	11.11	3	40
Prox. Metatarsal			4	7.41	2	26.67
Dist. Metatarsal			6	11.11	3	40
Tarsals	0	0	0	0	0	0
Astragulus	8	2.64	4	7.41	2	26.67
Calcaneus	4	1.32	3	5.56	1.5	20
Sesamoid	0	0	0	0	0	0
First Phalanx	21	6.93	21	38.89	2.63	35.07
Second Phalanx	22	7.26	22	40.74	2.75	36.67
Third Phalanx	24	7.92	24	44.44	3	40
Long Bone Frags.	44	14.52				
Totals:	303					

Table 4.17. Hornaday River No. 15, First Component Designated by Stevenson: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	10	4.95	1	2.56	1	22.22
Mandible	18	8.91	9	23.08	4.5	100
Hyoid	2	0.99	2	5.13	1	22.22
Atlas	1	0.5	1	2.56	1	22.22
Axis						
Cervical V.	2	0.99	2	5.13	0.4	8.89
Thoracic V.	5	2.48	5	12.82	0.38	8.84
Lumbar V.						
Ribs	39	19.31	39	100	1.5	33.33
Sternum	1	0.5	1	2.56	1	22.22
Pelvis	1	0.5	1	2.56	1	22.22
Sacrum						
Scapula	9	4.46	9	23.08	4.5	100
Humerus	6	2.97	6	15.38	3	66.67
Prox. Humerus			6	15.38	3	66.67
Dist. Humerus						
Radius	8	3.96	4	10.26	2	44.44
Prox. Radius			4	10.26	2	44.44
Dist. Radius			4	10.26	2	44.44
Ulna	2	0.99	2	5.13	1	22.22
Prox. Ulna			2	5.13	1	22.22
Dist. Ulna						
Carpals	1	0.5	1	2.56	0.08	1.78
Metacarpals	8	3.96	8	20.52	4	88.89
Prox. Metacarpal			5	12.82	2.5	55.56
Dist. Metacarpal			3	7.69	1.5	33.33
Femur	4	1.98	4	10.26	2	44.44
Prox. Femur			1	2.56	0.5	11.11
Dist. Femur			3	7.69	1.5	33.33
Patella						
Tibia	3	1.49	3	7.69	1.5	33.33
Prox. Tibia			2	5.13	1	22.22
Dist. Tibia			1	2.56	0.5	11.11
Metatarsal	11	5.45	6	15.38	3	66.67
Prox. Metatarsal			5	12.82	2.5	55.56
Dist. Metatarsal			6	15.38	3	66.67
Tarsals						
Astragulus	6	2.97	6	15.38	3	66.67
Calcaneus	3	1.49	3	7.69	1.5	33.33
First Phalanx	13	6.44	13	33.33	1.63	36.22
Second Phalanx	18	8.91	18	46.15	2.25	50
Third Phalanx	12	5.94	12	30.77	1.5	33.33
Long Bone Frags.	19					
Totals:	202					

Table 4.18. Hornaday River No. 15 Feature 4 Second Component Designated by Stevenson: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	6	5.94	1	6.67	1	33.33
Mandible	5	4.95	5	33.33	2.5	33.33
Hyoid	1	0.99	1	6.67	0.5	16.67
Atlas						
Axis						
Cervical V.	5	4.95	5	33.33	1	33.33
Thoracic V.	1	0.99	1	6.67	0.08	2.67
Lumbar V.						
Ribs	15	14.85	15	100	0.65	21.67
Sternum	3	2.97	3	20	3	100
Pelvis	2	1.98	2	13.33	2	66.67
Sacrum						
Scapula	2	1.98	2	13.33	1	33.33
Humerus	3	2.97	3	20	1.5	50
Prox. Humerus			3	20	1.5	50
Dist. Humerus						
Radius	3	2.97	3	20	1.5	50
Prox. Radius			2	13.33	1	33.33
Dist. Radius			1	6.67	0.5	16.67
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals	5	4.95	5	33.33	0.42	14
Metacarpals	5	4.95	3	20	1.5	50
Prox. Metacarpal			2	13.33	1	33.33
Dist. Metacarpal			3	20	1.5	50
Femur						
Prox. Femur						
Dist. Femur						
Patella	1	0.99	1	6.67	0.5	16.67
Tibia	2	1.98	2	13.33	1	33.33
Prox. Tibia			1	6.67	0.5	16.67
Dist. Tibia			1	6.67	0.5	16.67
Metatarsal	5	4.95	3	20	1.5	50
Prox. Metatarsal			3	20	1.5	50
Dist. Metatarsal			2	13.33	1	33.33
Tarsals						
Astragulus	2	1.98	2	13.33	1	33.33
Calcaneus	1	0.99	1	6.67	0.5	16.67
Sesamoid						
First Phalanx	8	7.92	8	53.33	1	33.33
Second Phalanx	5	4.95	5	33.33	0.63	21
Third Phalanx	14	13.86	14	93.33	1.75	58.33
Long Bone Frags.	7					
Totals:	101					

Table 4.19. Hornaday River No. 15 Feature 1: Tent Ring: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	4	13.33	1	16.67	1	33.33
Mandible	6	20	6	100	3	100
Hyoid						
Atlas						
Axis						
Cervical V.						
Thoracic V.						
Lumbar V.						
Ribs	5	16.67	5	83.33	0.19	6.33
Sternum						
Pelvis	1	3.33	1	16.67	1	33.33
Sacrum						
Scapula	3	10	3	50	1.5	50
Humerus	1	3.33	1	16.67	0.5	16.67
Prox. Humerus			1	16.67	0.5	16.67
Dist. Humerus						
Radius						
Prox. Radius						
Dist. Radius						
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals						
Metacarpals	2	6.67	2	33.33	1	33.33
Prox. Metacarpal			1	16.67	0.5	16.67
Dist. Metacarpal			1	16.67	0.5	16.67
Femur	1	3.33	1	16.67	0.5	16.67
Prox. Femur						
Dist. Femur			1	16.67	0.5	16.67
Patella						
Tibia	1	3.33	1	16.67	0.5	16.67
Prox. Tibia			1	16.67	0.5	16.67
Dist. Tibia						
Metatarsal	2	6.67	1	16.67	0.5	16.67
Prox. Metatarsal			1	16.67	0.5	16.67
Dist. Metatarsal			1	16.67	0.5	16.67
Tarsals						
Astragulus	2	6.67	2	33.33	1	33.33
Calcaneus	1	3.33	1	16.67	0.5	16.67
Sesamoid						
First Phalanx						
Second Phalanx						
Third Phalanx						
Long Bone Frags.	1	3.33				
Totals:	30					

Table 4.20. Hornaday River No. 15 Feature 12: Hunting Blind: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	5	4.42	1	3.33	1	20
Mandible	10	8.85	10	33.33	5	100
Hyoid	2	1.77	2	6.67	1	20
Atlas	1	0.88	1	3.33	1	20
Axis						
Cervical V.						
Thoracic V.	5	4.42	5	16.67	0.38	7.6
Lumbar V.						
Ribs	30	26.55	30	100	1.15	23
Sternum						
Pelvis						
Sacrum						
Scapula	6	5.31	6	16.67	3	60
Humerus	3	2.65	3	10	1.5	30
Prox. Humerus			3	10	1.5	30
Dist. Humerus						
Radius	8	7.08	4	13.33	2	40
Prox. Radius			4	13.33	2	40
Dist. Radius			4	13.33	2	40
Ulna	2	1.77	2	6.67	1	20
Prox. Ulna			2	6.67	1	20
Dist. Ulna						
Carpals	1	0.88	1	3.33	0.08	1.6
Metacarpals	6	5.31	3	10	1.5	30
Prox. Metacarpal			3	10	1.5	30
Dist. Metacarpal			3	10	1.5	30
Femur	2	1.77	1	3.33	0.5	10
Prox. Femur			1	3.33	0.5	10
Dist. Femur			1	3.33	0.5	10
Patella						
Tibia						
Prox. Tibia						
Dist. Tibia						
Metatarsal	8	7.08	4	13.33	2	40
Prox. Metatarsal			4	13.33	2	40
Dist. Metatarsal			4	13.33	2	40
Tarsals						
Astragulus	3	2.65	3	10	1.5	30
Calcaneus	2	1.77	2	6.67	1	20
Sesamoid						
First Phalanx	6	5.31	6	20	0.75	15
Second Phalanx	5	4.42	5	16.67	0.63	12.6
Third Phalanx	6	5.31	6	20	0.75	15
Long Bone Frags.	2	1.77				
Totals	113					

Table 4.21. Amundsen Gulf No. 17: Caribou Element Counts

Element	NISP	%NISP	MNE	%MNE	MAU	%MAU
Skull	1	1.47	1	7.14	1	25.97
Mandible	2	2.94	1	7.14	0.5	12.99
Hyoid						
Atlas						
Axis						
Cervical V.						
Thoracic V.						
Lumbar V.						
Ribs	6	8.82	1	7.14	0.04	100
Sternum						
Pelvis	3	4.41	3	21.43	3	77.92
Sacrum						
Scapula						
Humerus						
Prox. Humerus						
Dist. Humerus						
Radius	7	10.29	6	42.86	3	77.92
Prox. Radius			6	42.86	3	77.92
Dist. Radius			1	7.14	0.5	12.99
Ulna						
Prox. Ulna						
Dist. Ulna						
Carpals	6	8.82	6	42.86	0.5	12.99
Metacarpals	3	4.41	2	14.29	1	25.97
Prox. Metacarpal			1	7.14	0.5	12.99
Dist. Metacarpal			2	14.29	1	25.97
Femur	2	2.94	1	7.14	0.5	12.99
Prox. Femur			1	7.14	0.5	12.99
Dist. Femur			1	7.14	0.5	12.99
Patella						
Tibia	6	8.82	5	35.71	2.5	64.94
Prox. Tibia			1	7.14	0.5	12.99
Dist. Tibia			5	35.71	2.5	64.94
Metatarsal	1	1.47	1	7.14	0.5	12.99
Prox. Metatarsal						
Dist. Metatarsal			1	7.14	0.5	12.99
Tarsals						
Astragulus						
Calcaneus						
Sesamoid						
First Phalanx	5	7.35	5	35.71	0.63	16.36
Second Phalanx	8	11.76	8	57.14	1	25.98
Third Phalanx	14	20.59	14	100	1.75	45.45
Long Bone Frags.	4	5.88				
Totals	68					

Seasonality of Site Occupations

I think that it is important at this point to examine the seasonal migration patterns of caribou in and around the Bluenose Lake area. The Bluenose Lake 6 site lies near a major caribou migration route, which is in use both during the spring and the fall; and presumably kills could occur at either of those times. Barren Grounds caribou migrate in early winter to boreal forests southeast of Bluenose Lake, and in late spring they migrate northwest to the calving grounds. The majority of the Bluenose herd calve between Bluenose Lake and the Hornaday/Roscoe Rivers (Riewe 1992:187). Farquharson notes that in the Stapylton Bay area, caribou hunting stayed "reasonably productive throughout the whole area, for after the caribou migration had passed in the spring, they moved to calving grounds immediately east of Bluenose Lake" (Farquharson 1976:39). Caribou were killed during the spring to supply meat throughout the summer. They were also hunted through the summer along the north coast of the mainland, or by walking inland or by boat along rivers (Farquharson 1976:39).

The presence of ground squirrel within the sites is indicative of either an early spring or fall occupation. Ground squirrel have been known to supplement the diet during the lean months prior to caribou migrations. Anderson, in discussing the Copper Inuit, reports "Early in the spring... they also shoot or snare a good many Arctic ground squirrels (Parry's spermophile) making use of both the flesh and the skins. Rock ptarmigan are also killed in some numbers with bows and arrows" (1917:262). D. Jenness frequently mentions (in S. Jenness, ed. 1991) the reliance upon ground squirrel, ducks, ptarmigan, sandpipers and loons during the early spring months when large game was scarce.

Certain problems arise from attempting to determine seasonality from migratory waterfowl in the Arctic. Gilbert et al (1981:1) note that determining seasonality from bird remains might be a bit tricky if migratory waterfowl or other species are locally nesting species which remain year-round. Determining seasonality of site occupation (as opposed to time of hunting) in the Arctic using waterfowl is not always advocated because "ducks and other seasonally available birds may be kept frozen, carried far from where they were collected, and eaten at any time of year" (Ibid.).

Stevenson suggests a late spring occupation for the Brock River No. 3 site, based upon the presence of immature caribou and migratory waterfowl. He also suggests that the site represents a palimpsest of seasonal and temporal occupations (1992:24). While Stevenson's conclusions regarding a spring occupation are plausible, reexaminations of the faunal data provide an additional insight into the seasonality of occupation.

The Bluenose Lake No. 6 site is interpreted by Stevenson as reflecting a spring occupation. He bases his conclusions upon the presence of fetal caribou remains and migratory waterfowl. The proximity of the Bluenose Lake site to a major caribou migration route may indicate that a multiple seasonal occupation is likely.

Stevenson's estimates of seasonality for the Hornaday River No. 15 site point towards a multiple season occupation. Features 1, 2, 3, 5, 12, and 21 are determined to be late spring or early summer occupations. Feature 4, lacking infant caribou, but possessing high proportions of subadult and adult caribou, as well as ground squirrel elements indicate to Stevenson a late summer or early fall occupation. Features 15, 17, 19 and possibly Features 8, 9, and 16 comprise the third occupation, which Stevenson suggests is a summer occupation based upon tent ring construction (they are of lighter construction than the other architectural features).

Owing to contradictory information obtained from the faunal assemblage and the architectural structures at the Amundsen Gulf No. 17 site, Stevenson suggests that either a fall or spring occupation is possible. Further analysis of the faunal material may provide a more concrete estimate regarding seasonality.

Other factors may be considered influential in the determination of the seasonality of sites' occupation. Spiess notes that hides from fall killed adults and fawns were of the best quality and preferred for making clothing (Speiss 1979:30). He also calculates that among caribou-dependent peoples, approximately 25 skins per person per year are required for adequate clothing and other miscellaneous items (1979:30). Coastal peoples, having access to seal skins, would require fewer caribou skins. Keeping this in mind, the large accumulations of caribou bone in these residential sites might represent not a palimpsest of multiple season occupations, but perhaps single congregations of several nuclear groups participating in a communal fall hunt. Immature caribou would be killed along with adult caribou in order to obtain their skins, as well as meat and fat. This type of event could explain the dearth of material culture remains, the lack of stratification within the sites, and the large numbers of caribou bones present.

Reconstruction of the seasonality of a site's occupation is critical to interpretation. Stevenson's original reconstructions are re-considered based upon further research concerning the faunal assemblages. While Stevenson estimates a spring occupation for sites containing "immature" caribou, fall occupation at the sites from which young caribou elements are recovered remains a possibility. Stevenson does, however, make an effort to specify whenever possible whether the immature caribou are fetal or newly born. As this effort is not always possible; some of Stevenson's analyses simply state "immature".

Reexaminations of faunal data from the Brock River No. 3 site indicate that a fall occupation must be considered. The presence of immature but not fetal caribou may be indicative of fall hunting for skins as well as food. A lack of medullary bone in the long bones of migratory waterfowl such as geese, also point towards a fall kill (C. Hickey, personal communication, 1993). Arnold (1981) notes that the presence or absence of medullary bone in migratory waterfowl is generally a good indicator of seasonality. Reproductively active females exhibit these calcium deposits within the long bones just previous to spring egg-laying. Closer examination of goose bones suggests a fall kill, contra Stevenson's proposal for spring. While it is possible that Stevenson's estimate for a spring occupation is accurate, a fall occupation is also very likely.

A closer examination of faunal remains from the Bluenose Lake No. 6 site would indicate that a fall as well spring occupation is likely. Presence of ground squirrel in some quantity may indicate occupation during a lean period prior to a caribou migration. If the Bluenose Lake 6 site were a later fall or early spring occupation where the inhabitants were waiting for the caribou to migrate southeast or northwest, they were likely supplementing the diet with anything "catchable", thus accounting for such a wide variety of species in the faunal assemblage. While the archaeological evidence presented within this thesis suggests that a late fall occupation is possible, all of the ethnographic evidence cited supports a spring occupation. Given the above evidence, there may exist two opposing hypotheses: 1) the possibility of a spring occupation; but also 2) fall or early winter. I think it is quite likely that this site was regularly used during either or both the periods of spring and fall caribou migrations.

As previously mentioned, Stevenson concludes a multiple seasonal occupation for the Hornaday River No. 15 site. I think that these conclusions are quite reasonable. Re-examinations of the faunal materials from the site indicate nothing to the contrary.

No estimates as to season of occupation is provided by Stevenson for the Amundsen Gulf No. 10 site on the basis of faunal evidence. However, he notes the light construction of tent rings and cache features. These, along with charred seal bone likely indicate a very brief occupation, during either the fall prior to moving onto the winter ice for sealing, or in spring while preparing to move inland. The lone caribou rib may represent meat stored overwinter and the seal brought from camps on the ice. Conversely, the seal may have been stored since the spring while the caribou had been acquired during the wamr months and brought to the coast in the fall. Conclusions will be presented later following further analyses.

Faunal analysis from the Amundsen Gulf No. 17 site suggests that a fall occupation is likely. Absence of medullary bone in migratory waterfowl remains might indicate a late summer or early fall kill. No fetal or subadult caribou remains were identified within the assemblage, a further indication of fall kills.

Chapter 5. Analysis, Behavioral Interpetations, and Conclusions

Introduction

The previous chapter provided summaries of site descriptions and interpretations by the original investigator with reference to Stevenson (1992) for further information. All but one site share a similarity, that of a predominance of caribou within the faunal assemblage. Initial results of the faunal analysis were included in Stevenson's 1992 report.

This chapter now presents an analysis of the bone data from the four sites examined within the project. A reexamination of these faunal assemblages yielded additional information relevant to reconstructing site activities and seasonality of site occupations. In addition, a focused search for medullary bone in migratory waterfowl, and investigations into the migratory routes of caribou have suggested some alternative hypotheses to those of Stevenson. Conclusion drawn within this analysis must be considered strictly exploratory, as the archaeology of the area is still relatively unknown. Conditions for developing the analyses are not ideal. Sites examined within this study are all small, as are the faunal assemblages. Further, I do not know how biased the sampling methods were, and urge that the reader accept conclusions drawn here as tentative and exploratory.

Selection and Attrition

In determining the extent of selection (that is, introduction into sites) of carcass parts, %MNE values from Tables 4.11 to 4.21 were plotted against the frequency of elements in a whole caribou carcass. In addition, %MAU values of elements in Tables 4.11 to 4.21 were plotted against their bulk densities in order to determine survivorship, or attrition, of bone. Spearman's Ranked Correlation (i.e.. Spearman's rho) was then used in each case to test the relationship between the archaeological element profiles and expected values obtained from a whole carcass and from bulk densities. This test was selected owing to its suitability as a non-parametric test of correlation for small data sets (Siegel 1956, Shennan 1988:132). This test operates at 91% efficiency of parametric testing when using the powerful Pearson r test (Siegal 1956:213). It also avoids specific problems associated with parametric testing such as the need for large sample sizes and requirements for random sampling in the collection of data. The statistical testing was performed using an IBM statistics program, the SPSS / PC+ statistics package Version 5.0.1. Graphics were generated using the CA Cricketgraph III program for the Macintosh. The faunal assemblages collected for the five archaeological sites are all very small, ranging from eight to slightly over 300 bones each. In order for a data set to be tested using parametric statistical methods, it must meet a certain set of criteria. One criteria in particular must be met, that of unbiased sampling in collecting the data set. Possible biases do exist with the collection methods utilized by Stevenson, therefore, it must be assumed that all of the assemblages were not collected in a systematic random fashion. While it might prove possible to conduct further statistical testing, simplicity is advocated for this endeavor. Following Thomas:

> The beauty of statistical theory is that it offers a means of clarifying that which is only perceived darkly. When the statistical methods themselves becloud the issue and obfuscate the obvious, then something UGLY has transpired (1978:235).

Bulk density values used in this study were derived by Lyman from deer skeletons (Odocoileus hemionus and O. virginianus) using photon densiometry techniques. These values are believed more accurate than those provided by Binford and Bertram (1977) and Binford (1981) (see Lyman 1985). The bulk density values of elements provide a measure of the survivorship of bones in a faunal assemblage.

Utility Indices

The utility indices, generated from the %MAUs in Table 4.11 to 4.21 and the previous examples of Binford (1978), provide a statement of the relative value of each element in terms of its associated meat, marrow, or grease or the combination of all three against the highest rated element (e.g., the femur, in the case of the meat index). The indices serve as indicators of human behavior with regards to importation into sites and processing of animals and their constituent parts. As a result of developing the utility indices, Binford suggests that observed patterning in the faunal frequencies may be reasonably viewed as resulting from the variable strategies employed in the use of food sources (1978:12). In order to maintain comparability with previously mentioned works that test utility, and to try to determine what types of activities were going on at the sites within this study, %MAU values for four sites, three features within the sites, and three occupational components within two sites were plotted versus utility indices for meat, marrow, and grease. As described previously, meat, marrow, and grease (yellow and white) utility values were derived by Binford (1978) using a single wild caribou and two domestic sheep. These indices, as well as others generated by investigators in recent years, have become standard comparative tools to facilitate analyses of human behavior with respect to animal carcasses.

In the comparisons below, and following Binford's reasoning, the closer the fit of the %MAU to the indices, the more likely that the assemblage reflects element selection by humans for the utility being tested (e.g. a good fit of %MAU with a meat index is likely to suggest that there was the introduction into the site of elements for consumption based on meat utility). Conversely, the poorer the fit of the %MAU to the indices, the less likely that element selection was for the utility in question (e.g. a poor fit of %MAU with a marrow index indicates that selection of elements was not based upon marrow utility). This however, begs the question of post-introduction modification and/or destruction of elements. To anticipate the results of the analyses, I shall note here that these two sets of behavior-element introduction and subsequent element destruction-are gender related (men with the first, and women with the second).

For example, positive correlations for %MAUs and meat indices could be expected if further processing for marrow and grease was not conducted. However, if marrow and grease processing also took place, high meat value elements, which are also usually high marrow and grease value elements (e.g. humerus), would be removed from the assemblage through varying stages of bone destruction. Positive correlations between %MAUs and marrow and grease indices would not necessarily be expected owing to the destruction of the high value elements during the actual extraction process. Therefore, a poor correlation of %MAUs to marrow or grease indices could actually be indicative of an inverse correlation. Marrow and/or grease processing may well have taken place, and the evidence has subsequently been reduced to fragments unrecognizable by archaeologists or virtually destroyed. In order to assess this possibility, the faunal assemblages from the sites and features are tested not only by the utility analyses but also to the whole versus partial carcass and Bone Density analyses.

Meat

Plots for %MAU versus the standard meat utility index derived by Binford for caribou are presented in the following analyses. These plots are employed to help in determining the extent to which meat was selected for introduction into the sites and features and as a means of attempting to ascertain activities carried out at these areas.

Marrow

Plots of %MAU versus the standard marrow utility index are presented in the site and feature analyses The marrow utility plots were constructed following Binford's example (1978) in order to determine the values of marrow bearing bones and the extent of their presence in archaeological sites. In an attempt to maintain continuity with previous studies, as well as to try and ascertain the impact of gender-related decision making upon the archaeological record, the marrow utility plots have been employed in this study.

Grease

Bones contain two types of fats or "grease", which is rendered through boiling from highly fragmented bones as a last stage of processing. White grease consists of the fat contained in the articular ends of long bones. It is generally preferred for consumption over yellow grease, which is found in the vertebrae, ribs and the mandible. Yellow grease, according to Binford (1978:32), is only processed in times of need, as it is of inferior quality to white grease, and much harder to process. The analyses below illustrate plots of %MAU scores versus the standard grease utility index devised for caribou by Binford (1978).

Cautionary Remarks

Certain drawbacks to employing utility indices exist and warrant mentioning before proceeding to interpretation of the above analytical results. Use of indices is often influenced by sample size. A minimum sample size is necessary in order to provide meaningful patterns. The minimum sample size is reached at the point when "occurrences of species, elements and portions becomes redundant and further data begins to repeat what already exists" (Woollett 1991:78). Most analytical methods require specialized types of data, as a result depleting the sample size. The previously stated removal of independent molars and unnumbered phalanges is such an example. Utility indices, too, operate to deflate a sample size, relying on the identification of activity-specific sub-assemblages. These sub-assemblages are then quantified and analyzed independently of other sub-assemblages. Such an approach is possible with large assemblages; enough data exists to sub-divide and create useful sub-sets. However, with such assemblages as those under consideration, sub-dividing may yield "erroneous" results, owing to the fact that in limited samples "random effects allow much more significant bias to occur" (Grayson, 1984:116-117).

A second drawback of utility indices becomes obvious when sites being studied are areas of carcass utilization. Utility indices assume certain types of past decisions resulted in the removal of low utility value carcass portions during the original disarticulation process (i.e., at the kill sites). Assemblages at the "home base" destinations, therefore, are produced with distinct patterns indicative of the anticipated extractive activities for which they were selected. Models of the types described above prove useful in situations where transportation costs are high, forcing hunters to remove parts of low utility early in the disarticulation process for the sake of efficiency.

Three features within the sites under consideration were chosen for application of utility index models on the basis of their previous interpretations of being activity-specific areas. Theoretically the features chosen reflect the types of decision-making behavior necessary for creation of activity-specific assemblages. Assemblages for these features become quite small when reduced into the requisite subcategories of elements (for example, the hunting blind). Woollett notes (1991:82) that a strict reliance upon utility indices using samples from random areas, or small assemblages in general, sometimes results in the loss of integrity in use-specific contexts, and less than reliable interpretations.

However, application of utility indices should yield a general impression of activities at the features examined. Spiess notes that the order of preference for caribou body parts remains fairly constant cross-culturally (1979:24). Ribs, head, and short ribs are of the highest preference for meat, with steaks and roasts being least favored. Stefansson (1960, in Spiess, 1979:24) explains this preference as corresponding to the high fat-to-meat ratio of the preferred elements. Binford's Nunamiut Ethnoarchaeology (1978), explores element preference with regards to transportation, demand, season, and age/sex of the animal in greater detail.

Scapulae

Efforts at determining seasonality of site occupation proved frustrating at best. At the suggestion of Dr. Hickey, another attempt at determining seasonality resulted in the analysis of the frequency of caribou scapulae in relation to the remainder of the assemblage. It is an exploratory method which will hopefully prove useful in seasonality estimates with further development. The logic for such an analysis follows. Scapulae, elements which contain high meat utility values but, unlike most other high meat utility elements (such as humeri and femurs) contain low marrow and grease utility values, might provide an indication of the introduction of high meat utility elements into a site when other high meat utility elements were subsequently destroyed during marrow or grease production.

Two opposing hypotheses may be presented as a means of interpreting the presence of scapulae in an assemblage. The first hypothesis suggests that a high frequency of scapulae in a faunal assemblage indicates a fall occupation. At this time, the animals are in prime condition, there are plenty of high marrow and grease utility elements to process, and there is really no need to process such low utility elements for grease. This hypothesis also suggests that a low frequency of scapulae relative to the remaining assemblage indicates a spring occupation. During the spring, the animals are in poor nutritional condition, the marrow is runny and considered unpalatable, thus many other bones, including high marrow and grease value elements were not processed at all.

The second hypothesis suggests essentially the opposite. Low frequencies of scapulae relative to the rest of the assemblage indicate a fall occupation. All of the marrow and grease bearing elements were processed, and scapulae were processed along with them. In terms of energy expenditure for the amount of marrow or grease to be obtained, when breaking up dense bones such as femurs and metatarsals, it requires very little additional energy to break up and include a few scapulae. Additionally, scapulae may accompany dried meat away from residential sites to other sites for later consumption. This hypothesis also postulates that a high frequency of scapulae present in a faunal assemblage indicates a spring occupation. With high meat utility, scapulae are introduced into residential sites. People living in a food-scarce situation are processing or even re-processing elements with high marrow and grease utility in order to obtain the last bit of usable nutrition. Scapulae, having very low marrow and grease utility, are considered not worth the effort of processing and may not be processed.

Data for the frequencies of scapulae in the assemblages will be examined below in the site by site analyses. Tentatively, it appears that the results of the analyses tend to support the second hypothesis.

Selection and Attrition in the Sites

Brock River No. 3

Statistical analysis of the Brock River 3 assemblage utilized caribou element counts listed in Table 4.11. No strong correlations were observed for any of the comparisons. Figure 5.1 suggests that the Brock River No. 3 assemblage lacks a true fit to %MNE values with the proportion of elements in a whole carcass (r=-.0254, p=.888). Axial elements are under-represented, with the exceptions of atlas vertebrae, pelves, and scapulae, all of which are highly over-represented. As the most common element, ribs reflect whole carcass proportions. Appendicular elements remain consistently under-represented with the exception of proximal humerus, which is over-represented. Partial rather than whole caribou carcasses were probably introduced into the site. If animals were killed during the spring and/or summer, when they were in relatively poor condition, hunters were likely removing the choicest parts at the kill site, transporting only these elements to the residential site, leaving less desirable portions at the kill site.

Comparisons of %MAU versus the Bulk Density in Figure 5.2 yielded a weak correlation (Spearman's r=-.2113, p=.238). Consistent over representation of moderate and light bulk density elements, coupled with the under representation of elements high in bulk density indicate that factors aside from simple attrition by weathering, etc., were instrumental in the formation of this assemblage. Human activity is suggested to have played a major role in assemblage formation.

Correlations between the %MAU and the Standard Meat Utility Index in Figure 5.3 are also rather weak (Spearman's r=.2782, p=.238). Over representation of low meat utility elements and elements such as astragali and calcaneii which are considered "waste" occurs, along with the under representation of elements high in meat utility.

Comparisons between the %MAU and the Standard Marrow Utility Index illustrated in Figure 5.4 revealed no significant correlation (Spearman's r=-.0660, p=.715). Elements containing highest marrow utility values are strongly under represented, with low marrow utility elements exhibiting strong over representation. There appears to be no real correlation between %MAU and the marrow utility index, suggesting that the inhabitants of this site introduced elements for qualities other than marrow utility, or-alternatively-that we see an "inverse signature" where high marrow utility elements were selectively destroyed to obtain marrow and the relevant bones have been reduced (possibly through subsequent grease processing) to an unrecognizable state.

In Figure 5.5 %MAUs were compared with the Standard Grease Utility Index for both white and yellow grease, with neither correlation proving significant (Spearman's r=-.1149, p=.524 for white grease, and r=.3285, p=.062 for yellow grease). Elements possessing the highest white grease utility values such as femurs, tibiae, and metacarpals are under represented. Elements having high yellow grease utility values are present in approximately the expected levels.

The seasonality of site occupation may be predicted by the seasonal nature of meat, marrow and grease qualities. A spring or summer occupation at the Brock River 3 site is suggested by Stevenson owing to the presence of migratory waterfowl and immature caribou remains (Stevenson 1992:124). Examinations of long bones of geese indicate no calcium build-up of medullary bone, suggesting a late summer or fall kill of the birds. The presence of subadult caribou, but the noticeable absence of very young caribou also suggests a late summer or possible fall kill. It should be noted, however, that neither the absence of medullary bone in migratory waterfowl nor the absence of infant caribou provide concrete evidence for a fall occupation. Given that there was an introduction of partial carcasses, combined with low meat, marrow, and grease utility correlations, the following scenario is likely. Animals were in poor nutritional condition, but there was some introduction of high meat, marrow, and grease utility elements. Scapulae represent 50% of the total MAUs, (see Table 5.1), suggesting that high meat utility elements were introduced into the site. Subsequent marrow and grease production from the highest marrow and grease elements also occurred. Scapulae, having low marrow and grease values were not processed. I suggest a spring occupation for this site.

From the previous discussions of statistical analysis, evidence from faunal remains, and clues provided by scapulae occurrence, the following general conclusions regarding activities at the Brock River 3 site may be drawn. Partial carcasses of caribou were introduced into the site, an indication of the active role of humans in the patterning of the faunal assemblage. Selection of elements was likely for highest meat utility, with later reduction of those elements highest for marrow and grease. The formation of the zooarchaeological record at this site was actively influenced by women, through the decision-making involved at each stage of carcass processing, as well as by the actual stages of processing. While the possibility of a fall occupation of the Brock River 3 site exists, proportions of scapulae to other elements as well as the presence of immature caribou indicate a probable late spring or summer occupation. It is suggested that Stevenson's estimate of a spring or summer occupation appears likely.

Figure 5.1. Brock River No. 3 %MNE / Whole Carcass Plot Spearman's r=-.0254, p=.888

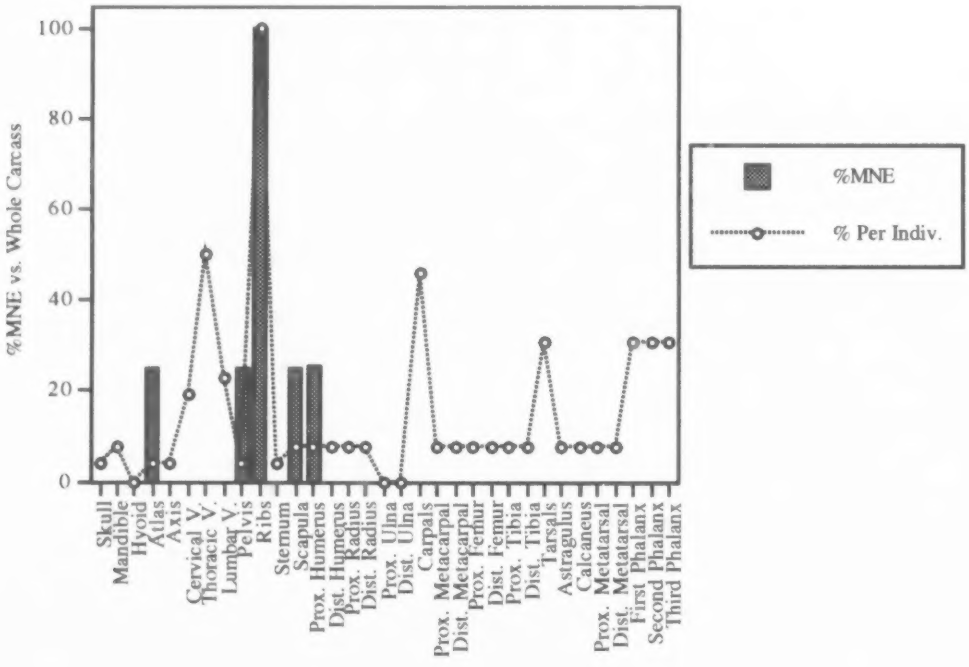


Figure 5.2. Brock River No. 3 %MAU / Standard Bulk Density Plot Spearman's r=-.2113, p=.238

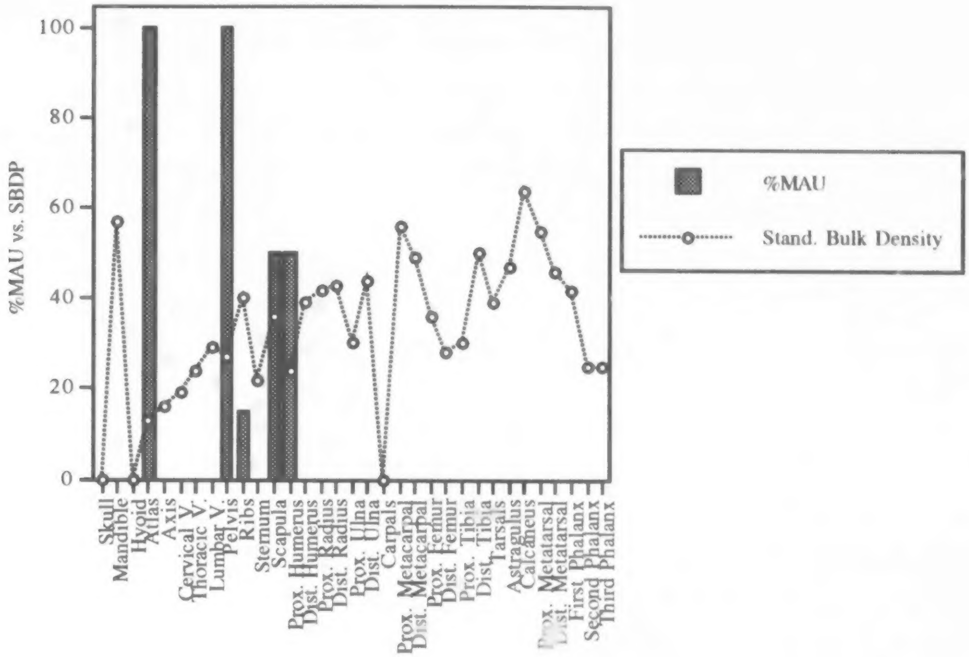


Figure 5.3. Brock River No. 3, %MAU / Standard Meat Utility Plot Spearman's r=.2782, p=.238

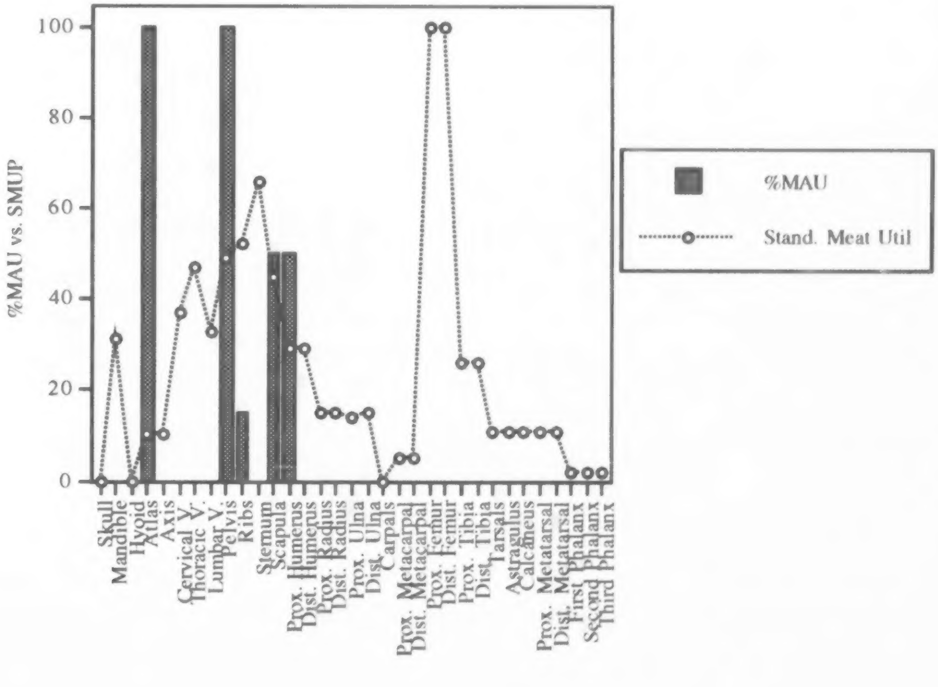


Figure 5.4. Brock River No. 3 %MAU / Standard Marrow Utility Plot; Spearman's r=-.0660, p=.715

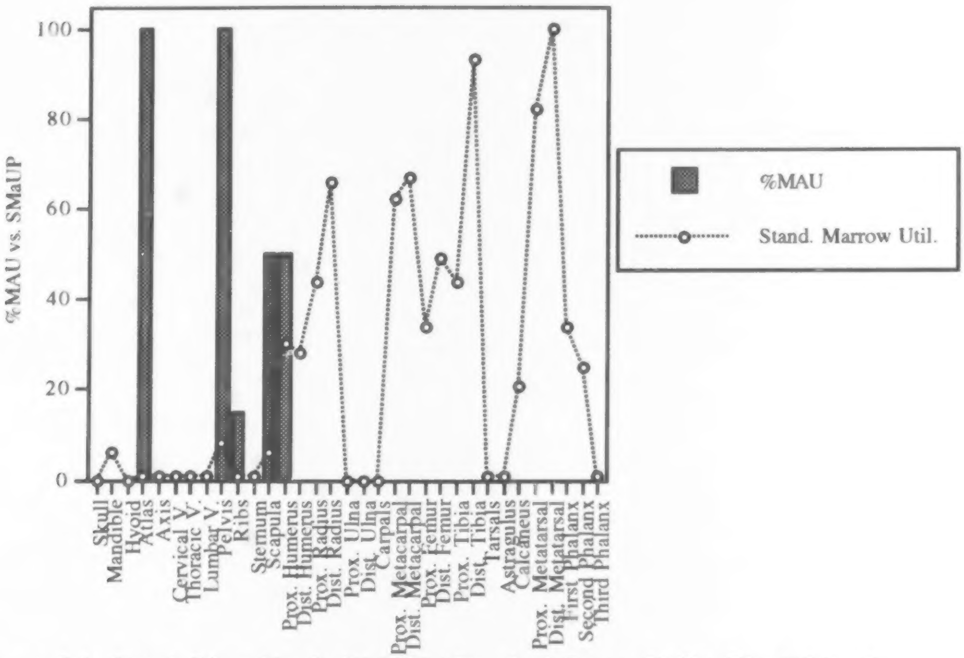
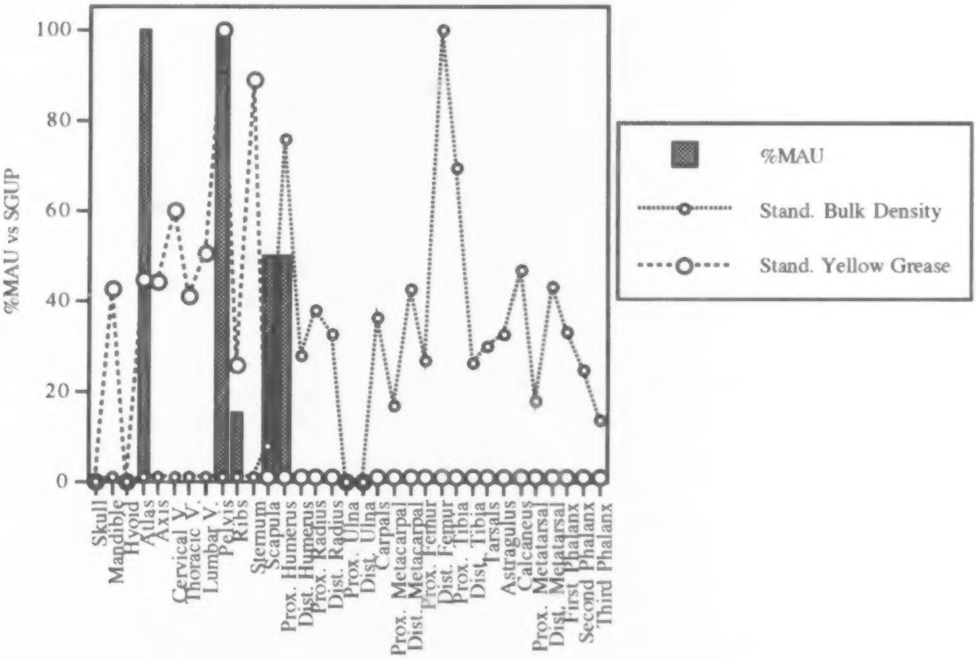


Figure 5.5. Brock River No. 3, %MAU / Standard Grease Utility Plot White Grease: Spearman's r=-.1149, p=.524 Yellow Grease: Spearman's r=.3285, p=.062



Bluenose Lake No. 6

Results of the statistical analysis of the Bluenose 6 assemblage yielded a single strong correlation. Correlations were made using the %MAUs derived in Table 4.12. Comparisons of %MNE versus the Whole Carcass Plot illustrated in Figure 5.6 indicate that whole carcasses were likely introduced into the site (Spearman's r=.4403, p=.010). With the exception of under represented vertebrae and limb elements, the plot exhibits similar fit to the expected model.

%MAU compared with the Standard Bulk Density Plot are illustrated in Figure 5.7. Comparisons offered a very weak correlation (Spearman's r=.01234, p=.946). A strong over representation of low and medium density elements exists, coupled with a marked under representation of high density elements suggests that factors aside from those of natural attrition (weathering, carnivore ravaging, etc.) influenced assemblage formation. Human activity represents a likely factor in this assemblage patterning.

Comparisons of %MAU with the Standard Meat Utility Plot in Figure 5.8 show no strong correlation (Spearman's r=-.2612, p=.142), indicating that elements were not being selected for their meat value. The plot exhibits a marked under representation of high meat utility elements. Low meat utility elements and elements that are generally regarded as waste are strongly over represented. Given the above whole carcass and bulk density analyses, it is possible to suggest that we see an inverse relationship where elements were actually being brought into the site for their meat utility, but with subsequent activities removing them from the assemblage.

The correlation of the %MAU with the Marrow Utility Index illustrated in Figure 5.9 appears very weak, (Spearman's r=.0123, p=.946). Low marrow utility elements are consistently over represented, while high marrow utility elements are underrepresented, with the exception of distal tibiae. The plot indicates an absence of high marrow elements, thus leading the reader to assume that elements were not selected for marrow utility. However, if we examine the plot from the negative or inverse perspective, and knowing that elements high in marrow and grease utility are drastically reduced during processing, this graph illustrating a lack of high value elements may actually be indicative of destruction of these elements for marrow processing. Elements were likely being removed from the assemblage by women during the processing activities.

If the site represents a spring occupation, as suggested by Stevenson, two scenarios could occur to explain the over representation of the distal tibia, an element with a very high marrow value, but a low meat utility. First, primarily high marrow elements such as limb bones may not have been introduced into the site for their marrow, but rather only introduced as elements having a high meat utility (e.g., humerus). Second, high marrow utility elements such as the tibia may have been introduced into the site as "riders" (Binford 1978) on elements having a high meat utility, such as the femur. As spring marrow is generally of poorer quality than fall or winter marrow, it is possible that once introduced into the site, the marrow bones were not intensively processed. Since the tibiae in this assemblage were broken, it may be that this breakage indicates that the condition of the marrow was being checked and, found to be poor, these bones were not further processed. As lower limb and foot bones appear in approximately the expected proportions or in greater than expected proportions, and axial elements are sharply over represented, this latter scenario seem likely.

Correlations of %MAU with the Standard Grease Utility Index in Figure 5.10 appear very weak for both white grease (Spearman's r=-.1496, p=.406) and yellow grease (Spearman's r=.0508, p=.779). Sharp over representations of low grease utility elements (both white and yellow), combines with an under representation of high grease utility elements suggesting a highly inverse relationship to the expected plots, with a strong selection for and reduction of high grease utility elements.

Stevenson suggests a spring occupation for the Bluenose Lake No. 6 site, based upon the presence of fetal caribou bones and the presence of migratory waterfowl. With a number of species represented, as well as the presence of fetal caribou in the assemblage, this could indicate a spring occupation. There could have been a fall occupation as well. The Bluenose site is located near a major caribou migration route which is in use both during spring and fall, making both fall and spring occupations quite reasonable. Absence of medullary bone in the longbones of waterfowl indicates a kill after egg-laying season at the very least. Presence of ground squirrel in fair quantities reflects their utilization as a food source either during spring or late summer: the two leanest periods. Species otherwise not normally hunted specifically for food find their way into the larder as supplements to the diet. If the occupants of this site were waiting for caribou migrations to begin in the early fall, they might feel the necessity to take whatever species were available, possibly explaining the diversity of species at this site.

Scapulae represent 60% of the maximum MAU for the Bluenose Lake No. 6 assemblage. This proportion of scapulae to other skeletal elements suggests that high meat utility elements were introduced into the site, despite weak %MAU/Meat Utility correlations. Given that whole carcasses were introduced, these other elements were probably later eliminated for purposes other than meat utility. This would not likely be the case if this were solely a spring occupation when the animals were in poor condition.

In summarizing the previous discussion, it is possible to draw some general conclusions regarding the Bluenose Lake No 6 site, based upon the statistical analysis, evidence from the faunal assemblage, and the observations of scapulae occurrence. Whole caribou carcasses were likely introduced into the Bluenose 6 site, with on-site human activity being responsible for the assemblage patterning. Elements were selected primarily for meat utility, while some elements were later being reprocessed for marrow and still later for bone grease. Formation of the faunal assemblage within the site reflects both primary (male) additive decision-making and secondary (female) reductive decision-making related to carcass processing activities.

The lack of significant correlations for marrow and grease plots could indicate that elements were not imported for their marrow or grease utility. However, given whole carcass introductions, inverse relationships may be suggested as some high value marrow and grease elements were subsequently removed from the archaeological record. Proportions of scapulae to other elements more than likely reflect mixed spring and fall occupations, with scapulae representing 60% of the MAU from the site. Therefore, while the evidence generally supports the conclusion of primarily fall occupations, the site's proximity to a major seasonal caribou migration route does not rule out the feasibility of spring occupations, also. This will be examined below when considering the separate components within the site, suggested by Stevenson.

Figure 5.6. Bluenose Lake No. 6 %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.4403, p=.010

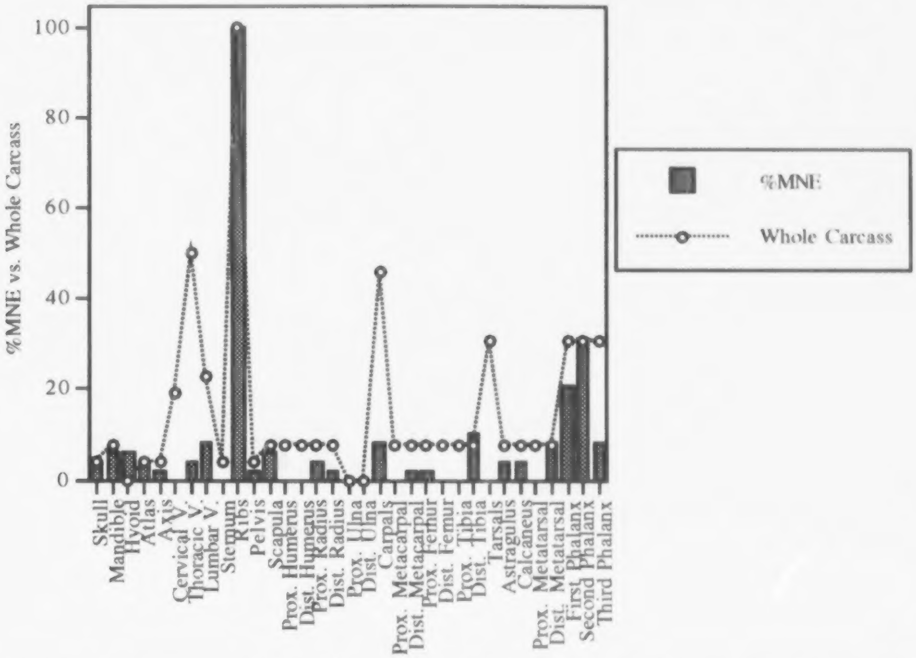


Figure 5.7. Bluenose Lake No. 6 %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.0123, p=.946

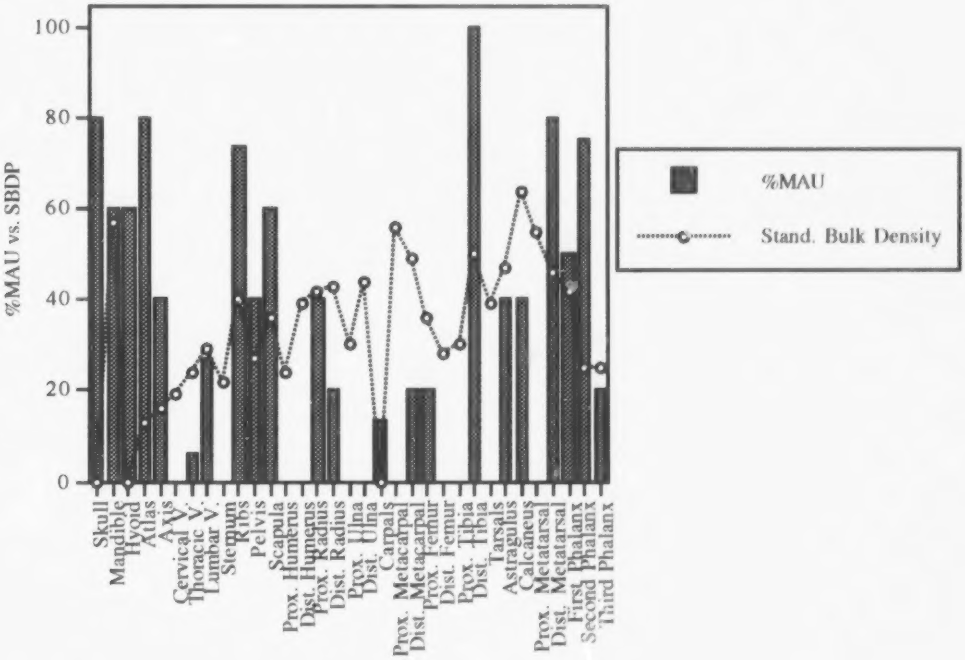


Figure 5.8. Bluenose Lake No. 6, %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.2612, p=.142

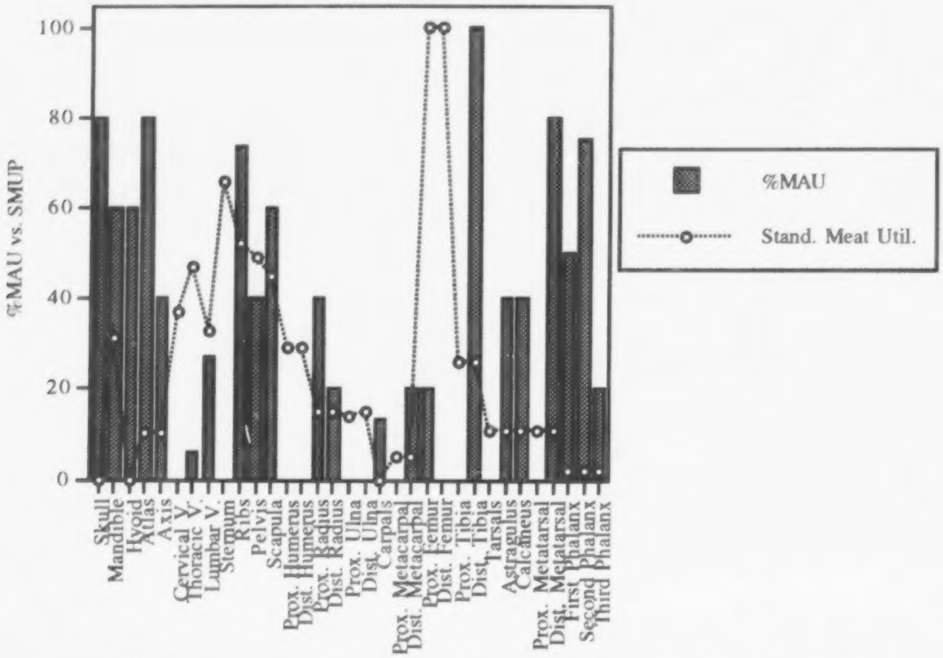


Figure 5.9. Bluenose Lake No. 6 %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=.0123, p=.946

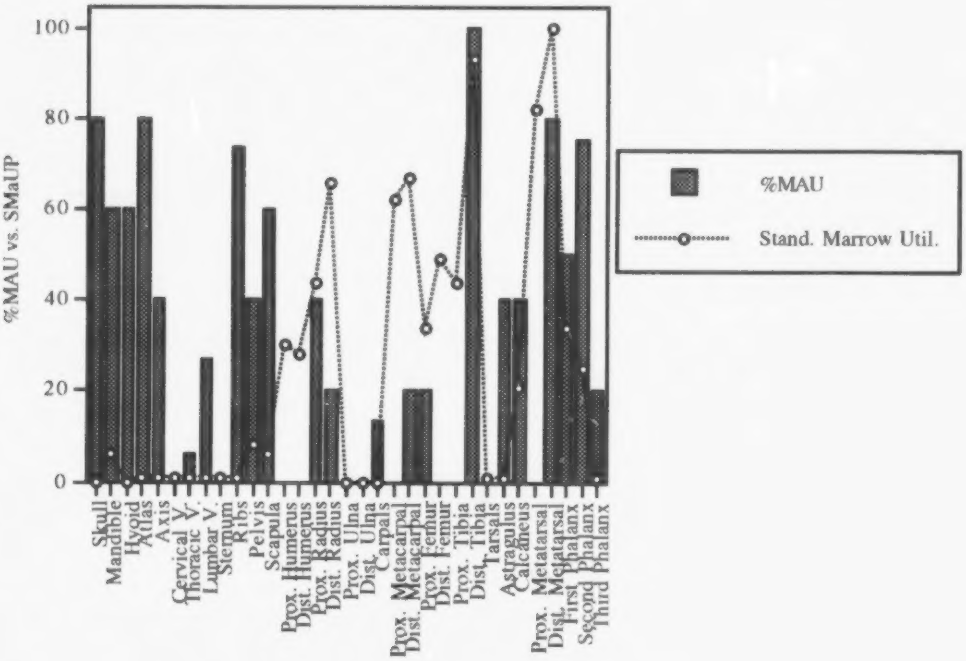
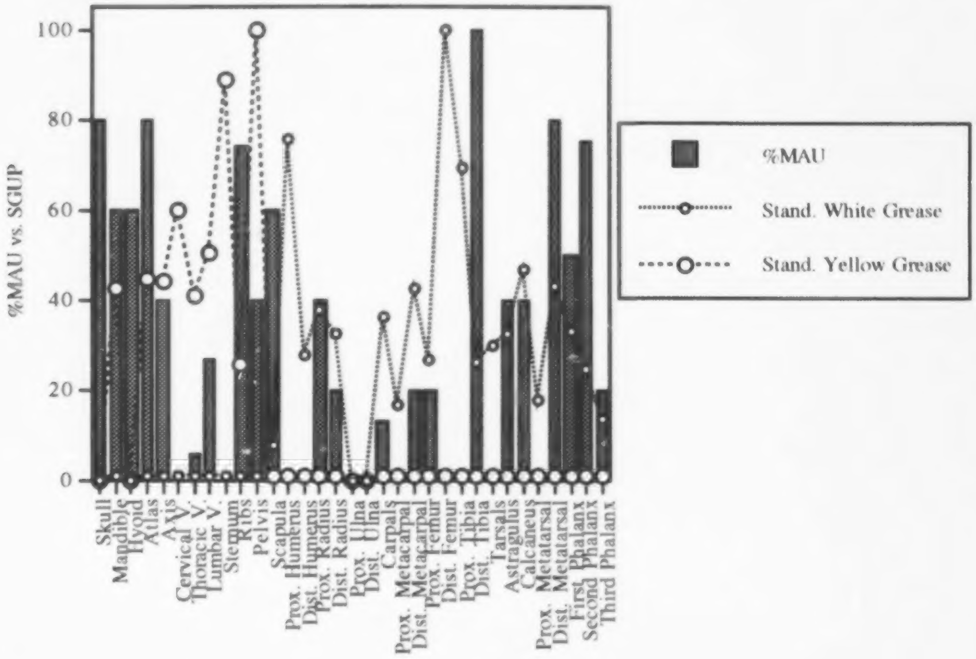


Figure 5.10. Bluenose Lake No. 6, %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=-.1496, p=.406 Yellow Grease: Spearman's r=.0508, p=.779



Bluenose Lake No. 6: Feature 1 (First Component)

Feature 1, a "heavily bilobate tent ring" (Stevenson, 1992:126), represents the first occupational component suggested by Stevenson at the Bluenose Lake No. 6 site. Statistical analysis of the assemblage using %MAUs derived from Table 4.13 yielded no strong correlations for any of the tests of this small assemblage. Comparisons of the %MNE and Whole Carcass plots in Figure 5.11 revealed no correlation (Spearman's r=.0, p=.0). The plot exhibits no fit with the expected model, indicating that whole carcasses were not introduced into the site during this occupation.

A weak correlation resulted from the comparison of %MAU versus the Standard Bulk Density Plot illustrated in Figure 5.12 (Spearman's r=-.1739, p=.742). Under representations of high bulk density elements coupled with over representations of low and medium density elements indicates that factors other than simple attrition are responsible for assemblage patterning. Human activity is likely the major cause for the formation of this assemblage.

Comparisons of %MAUs with the Standard Meat Utility Index presented in Figure 5.13 revealed a weak correlation (Spearman's r=-.3189, p=.538), with moderate and low meat utility value elements being over represented. High meat utility elements exhibit under representation, indicating that element importation was not based upon meat utility.

%MAUs were compared to the Marrow Utility Index in Figure 5.14, yielding no strong correlation (Spearman's r=.3757, p=.463), and virtually no representation of either high or low marrow utility elements.

Shown in Figure 5.15, comparisons of the %MAU with the Grease Utility Index indicate no strong correlation for either white or yellow grease (Spearman's r=.3601, p=.483, and Spearman's r=-.2500, p=.633, respectively). All elements possessing high white and high yellow grease utility are under represented in both plots. It is unlikely that they were introduced.

Stevenson suggests a spring occupation for Feature 1 based upon the presence of very young caribou elements. The possibility of an alternative occupation of fall has also been suggested here, supported by the lack of species diversity. However, the presence of very young (perhaps fetal) caribou, along with ground squirrel, likely indicates a spring occupation.

Scapulae comprise 65% of the maximum MAU for the Feature 1 assemblage, providing evidence for the introduction of high meat utility elements into the site, contrary to the weak %MAU/Meat utility correlations. By interpreting the inverse relationship of the %MAU/Meat Utility Index correlation, therefore, we may surmise that somehigh meat utility elements were probably introduced into the site at least on a limited basis, and later removed from the assemblage either by transportation away from the area or through further stages of reduction for marrow and grease processing.

Several general conclusions may be drawn regarding Feature 1, based upon the information gained from the faunal assemblage, statistical analysis, and the observations of scapulae occurrence. Lack of a correlation for the %MNE/Whole Carcass Plot indicates that whole carcasses were likely not introduced into the site. In fact, it is very likely that large numbers of elements were never introduced into the site at all during this occupation. This would be consistent with the generally poor quality of a spring kill, when only the best elements are returned to the site. Weak correlations between the %MAU and the Standard Bulk Density Plot indicate that factors other than simple attrition (such as human activity), were instrumental in the formation of the assemblage. Weak %MAU/Meat Utility correlations indicate that high meat utility elements were either removed through further processing, or transported away from the site. The complete absence of high marrow utility elements suggests that either the marrow bones were processed and reduced to a degree as to be undiagnostic by archaeologists, or they were never introduced and processed at the site. Very weak correlations between the

%MAU and the Standard Grease Utility Plots suggest that elements were not selected for either white or yellow grease processing. Highly inverse relationships created by the weak correlations may be interpreted in most cases as providing indirect evidence for meat, marrow and grease processing activities. However, given the limited size of this assemblage such interpretations would be tenuous.

Activities specifically attributed to women, such as marrow and grease processing, do not appear to have been carried out to any degree at Feature 1. Interpreting the inverse relationships of all of the correlations might lead to the conclusion that all of activities previously discussed occurred to a large extent. However, the absence of elements possessing both high and low utility, and waste elements as well, leads to the conclusion that this was a very brief, probably spring occupation, in which elements were not accumulated for processing. This site provides only marginal evidence of women's activities. Considering the temporary nature of the site as suggested by Stevenson (1992), and the small size of the assemblage, (only 10 elements are represented), it is possible that large-scale marrow and grease processing never occurred during this occupation. This component probably contributes to the weak 'spring occupation' appearance of the site as a whole.

Figure 5.11. Bluenose Lake No. 6, Feature 1, Component One Designated by Stevenson %MNE / Whole Carcass Plot by Skeletal Element Spearman's r= 0, p=0.

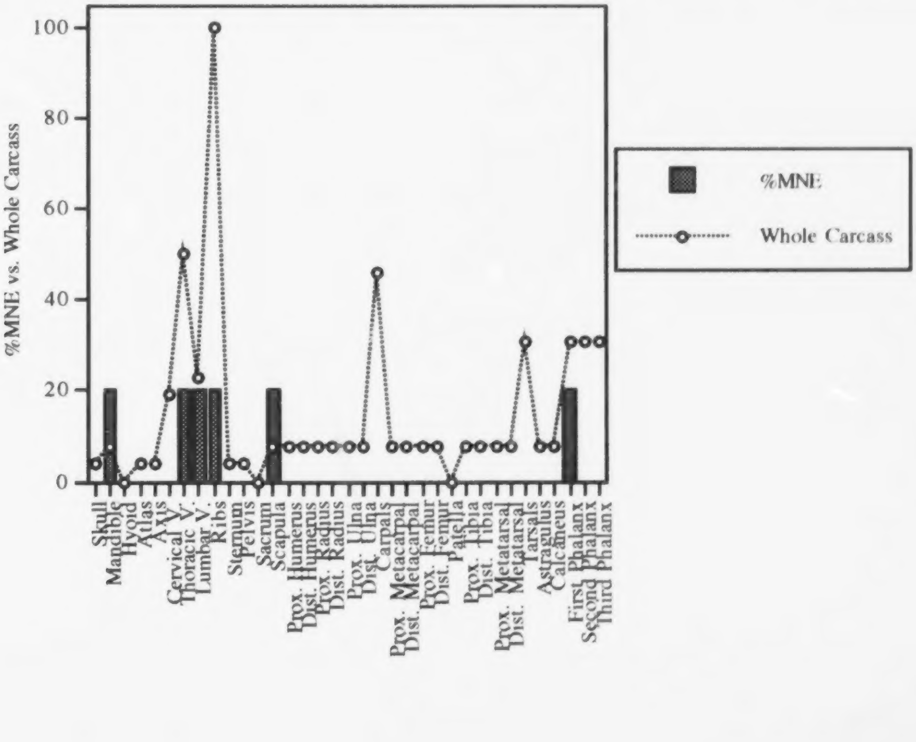


Figure 5.12. Bluenose Lake No. 6 Feature 1 / Component One Designated by Stevenson %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=-.1739, p=.742

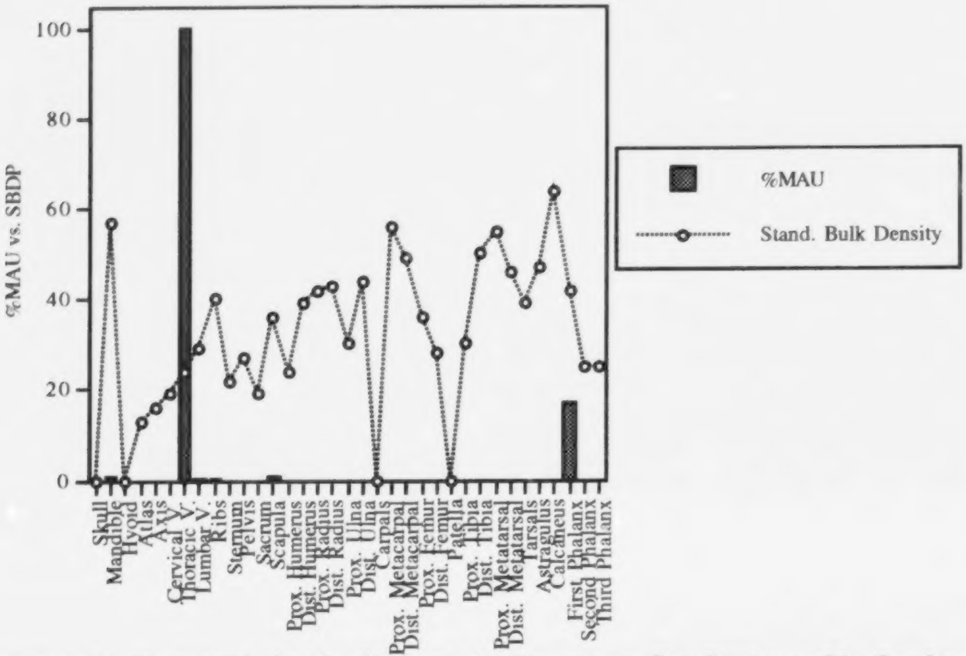


Figure 5.13. Bluenose Lake No. 6 Feature 1 / Component One Designated by Stephenson %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.3189, p=.538

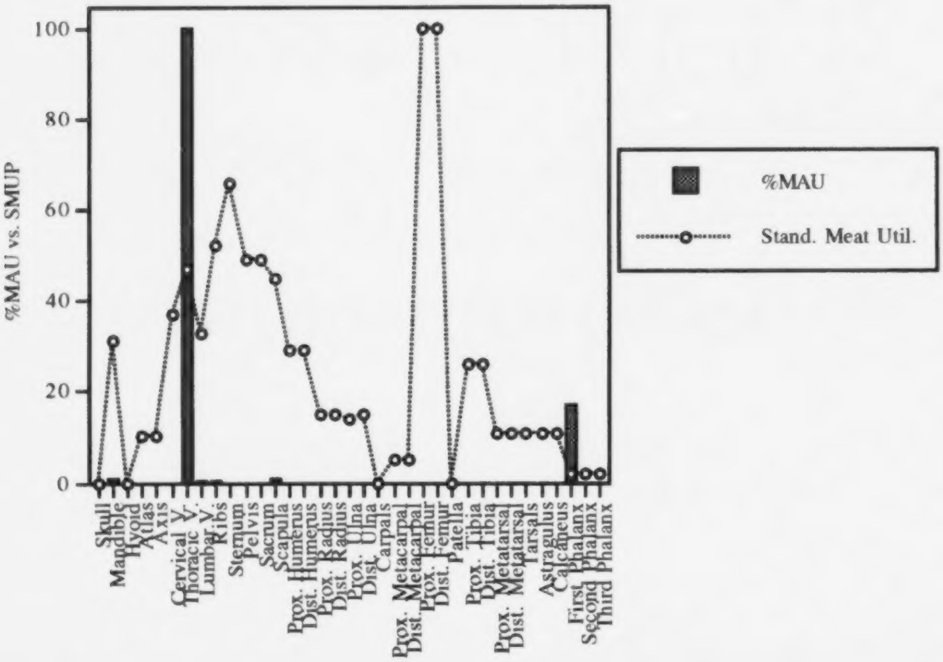


Figure 5.14. Bluenose Lake No. 6, Feature 1 / Component One Designated by Stevenson %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=.3757, p=.463

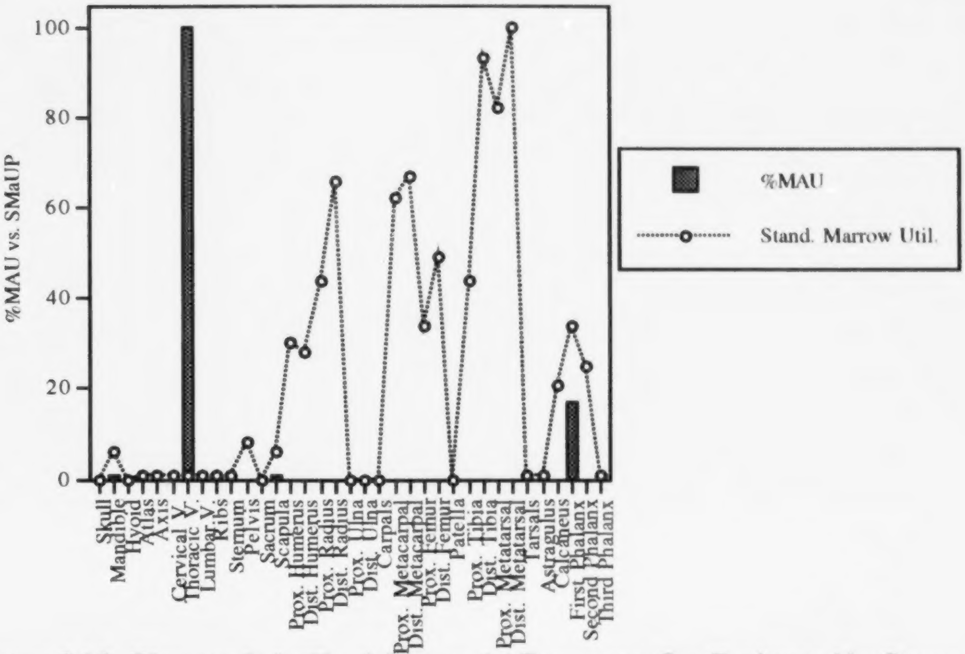
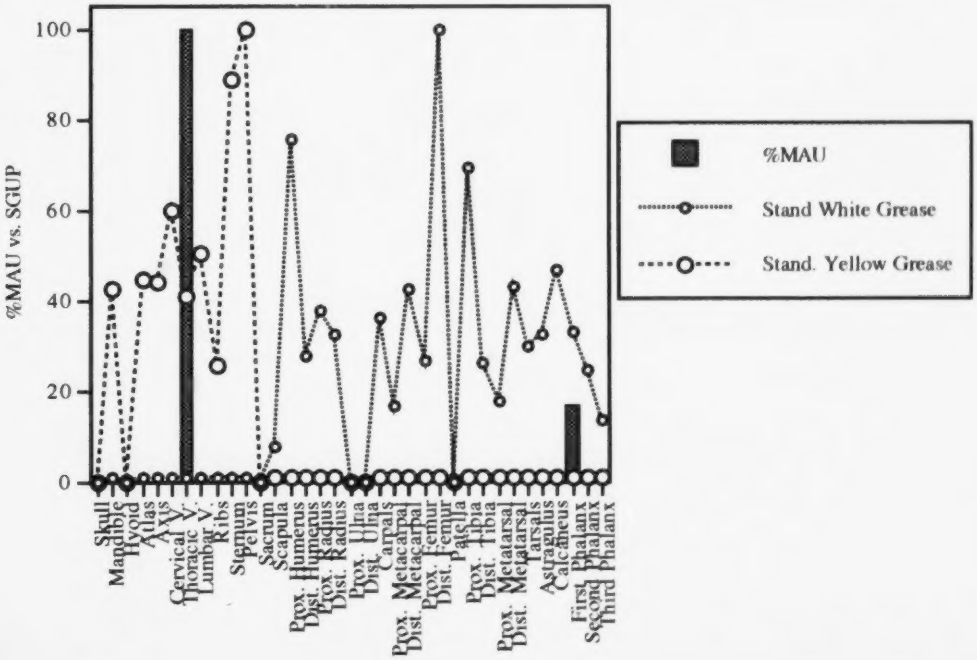


Figure 5.15. Bluenose Lake No. 6, Feature 1 / Component One Designated by Stevenson %MAU / Standard Grease Utility Plot; White Grease by Skeletal Element Spearman's r=.3601, p=.483 Yellow Grease: Spearman's r=-.2500, p=.633



Bluenose Lake No. 6: Feature 15 (Tent Ring and Second Component)

Feature 15, a tent ring, represents the second occupational component suggested by Stevenson at the Bluenose Lake No. 6 site. Statistical analysis of the occupation using %MAUs derived from Table 4.14 revealed no strong correlations for any of the tests. Comparisons of %MNE to the whole carcass plot illustrated in Figure 5.16 yielded a very weak correlation (Spearman's r= .0669, p= .712). The plot exhibits a very poor fit with the expected model, suggesting the introduction of partial rather than whole carcasses into the site at this period in its formation.

Comparisons of %MAU with the Standard Bulk Density Plot shown in Figure 5.17 revealed a very weak correlation (Spearman's r= -.0828, p= .647). High bulk density elements are under represented, while low bulk density items exhibit over representation. While natural attrition may be partially responsible for the generation of this assemblage, it is suggested that human activity accounts for most of the assemblage patterning at this site.

A weak correlation was obtained for the comparison of %MAUs and the Standard Meat Utility Index illustrated in Figure 5.18 (Spearman's r= -.1487, p= .409). High meat utility elements are under represented, while low and moderate meat utility elements exhibit over representation. The lack of high meat utility elements could reflect their removal for successive stages of marrow and grease processing. It is also likely that either high meat utility elements were not introduced into the site or were transported away from it, which is likely if the interpretation of the %MNE/Whole Carcass plot (indicating the introduction of partial carcasses) is correct.

Comparisons of the %MAU versus the Marrow Utility Index yielded a weak correlation in Figure 5.19 (Spearman's r= -.2051, p= .252), with highest marrow utility elements under represented. Elements possessing low and moderate marrow utility appear over represented. The plot exhibits no fit with the expected model.

%MAUs compared with the Standard Grease Utility Index in Figure 5.20 reveal very weak correlations for both the white and yellow grease plots (Spearman's r=-.1579, p=.380, and Spearman's r=-.0623, p=.731 respectively). The plots demonstrate under representation of high utility elements for both white and yellow grease. Low to moderate white and yellow grease elements exhibit marked over representation.

Stevenson suggests a spring occupation for Feature 15 based upon the remains of fetal caribou within the assemblage. The presence of other species besides caribou in the faunal assemblage could indicate a spring occupation as well. An alternative hypothesis, that of a possible fall occupation, is also considered here. Stevenson's spring hypothesis is not supported by observations of the proportions of scapulae to other elements in the assemblage.

Scapulae represent only 17% of the maximum MAU from the second occupation assemblage, indicating that at least some high meat utility elements were introduced into the site, but--if more than a few--then most disappeared because of later activities. The %MAU/Meat Utility correlation is also weak, (Spearman's r=-.1487, p=.409), suggesting the possible removal of elements for purposes other than meat utility. If so, this suggests that meat elements that were additionally high in marrow and grease were later processed--indicating healthy animals and a fall occupation.

A few general conclusions may be drawn concerning the activities at Feature 15, from the Bluenose Lake No. 6 site. Weak correlations between the %MNE and the Whole Carcass Plot indicates that whole carcasses were likely not introduced into the occupation. Following Binford, this could mean that kills were made at some distance from the base camp if no other indications suggest fall occupation. Alternatively, regardless of kill location(s), if spring were the time of occupation, only the best of generally poor carcasses may have been brought back to the camp. Over representations of low and medium bulk density elements combined with under representations of high bulk density elements suggest patterning by forces other than natural attrition. Human activity is likely the primary agent responsible for assemblage formation. Given the above, weak correlations for the %MAUs versus the meat, marrow, and grease (white and yellow) utility indices do not indicate introduction of many of these elements into the features for the qualities in question, Or, by observing the negative relationships created by the poor correlations, it is possible to conclude that elements were being processed for their meat, marrow, and grease utility. Absences of high utility value elements should then result from their selection for processing, reduction and eventual removal from the faunal assemblage. Indirect evidence for the gender-specific activities of marrow and grease processing may be provided by the highly inverse relationships demonstrated within the utility plots, suggesting that women were actively influencing the generation of the archaeological record. This occupation could have been multi-seasonal, during the late spring and again in the fall. There was not, however, an intensive exploitation of caribou in any case. The component contributes to the weak 'spring' appearance of the overall site assemblage.

Figure 5.16. Bluenose Lake No. 6, Feature 15 Tent Ring / Component Two Designated by Stevenson: %MNE / Whole Carcass Plot by Skeletal ElementSpearman's r=.0669, p=.712

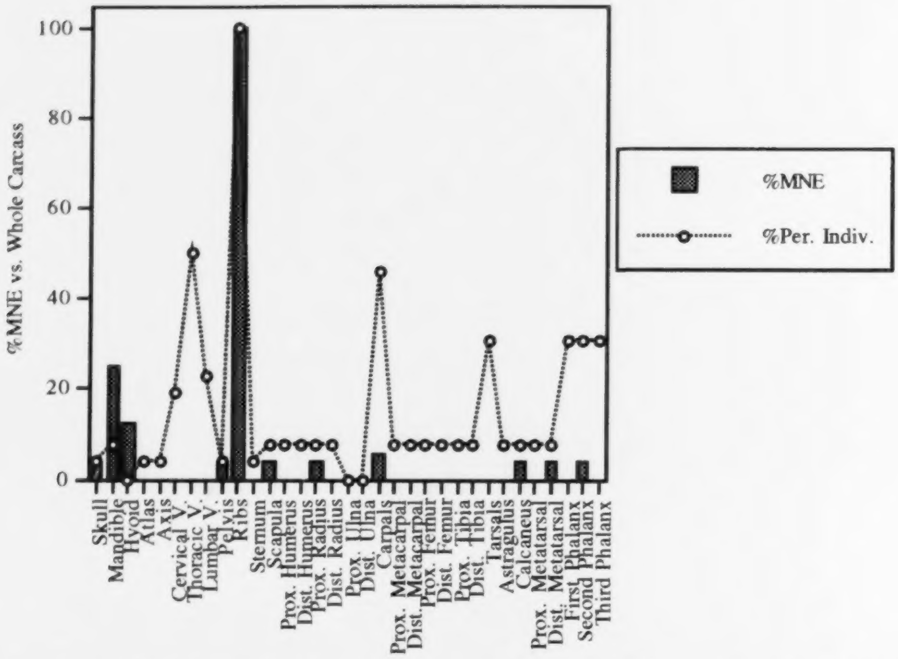


Figure 5.17. Bluenose Lake No. 6 Feature 15 Tent Ring/ Component Two Designated by Stevenson %MAU / Standard Bulk Density Plot by Skeletal ElementSpearman's r=-.0828, p=.647

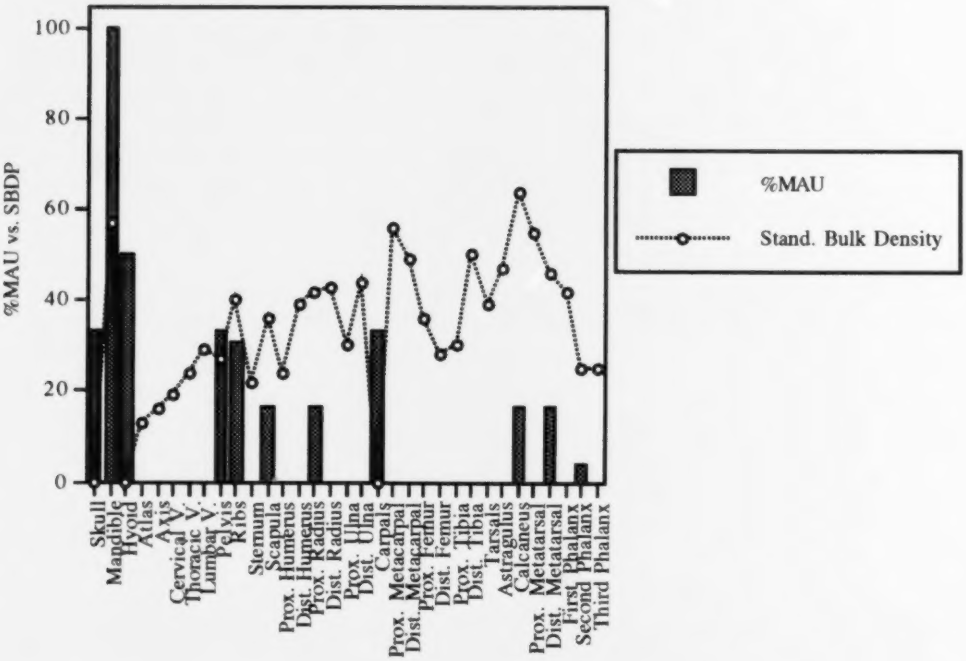


Figure 5.18. Bluenose Lake No. 6, Feature 15 Tent Ring and Component Two Designated by Stevenson - %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.1487, p=.409

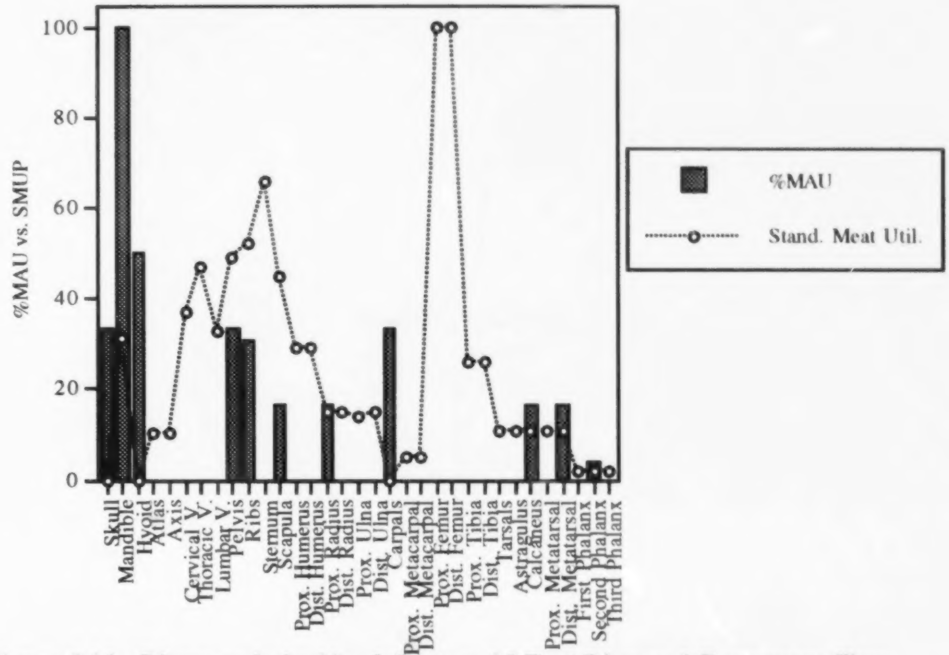


Figure 5.19. Bluenose Lake No. 6, Feature 15 Tent Ring and Component Two Designated by Stevenson: %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=-.2051, p=.252

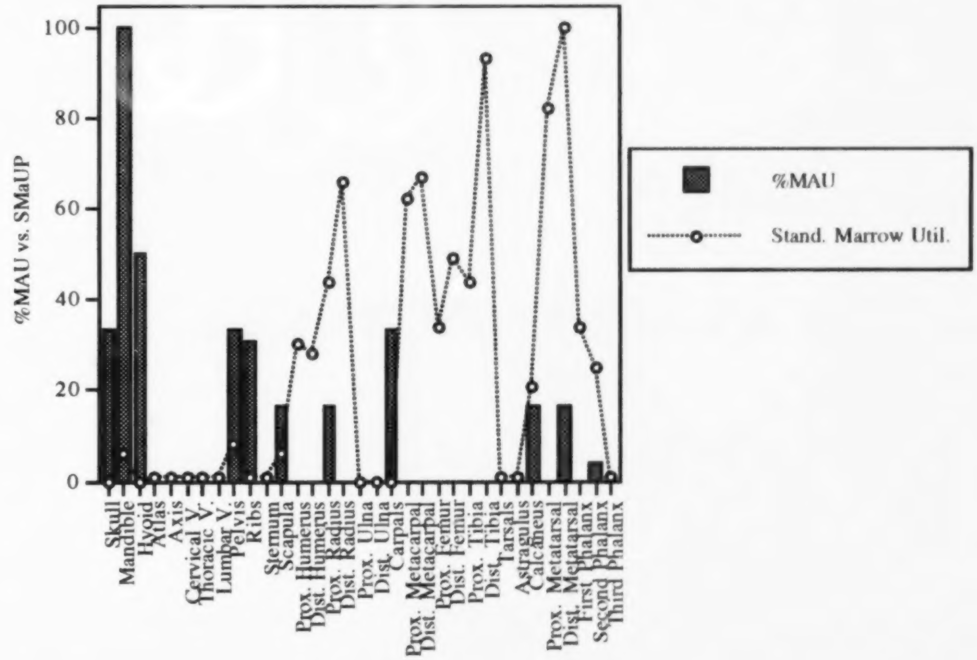
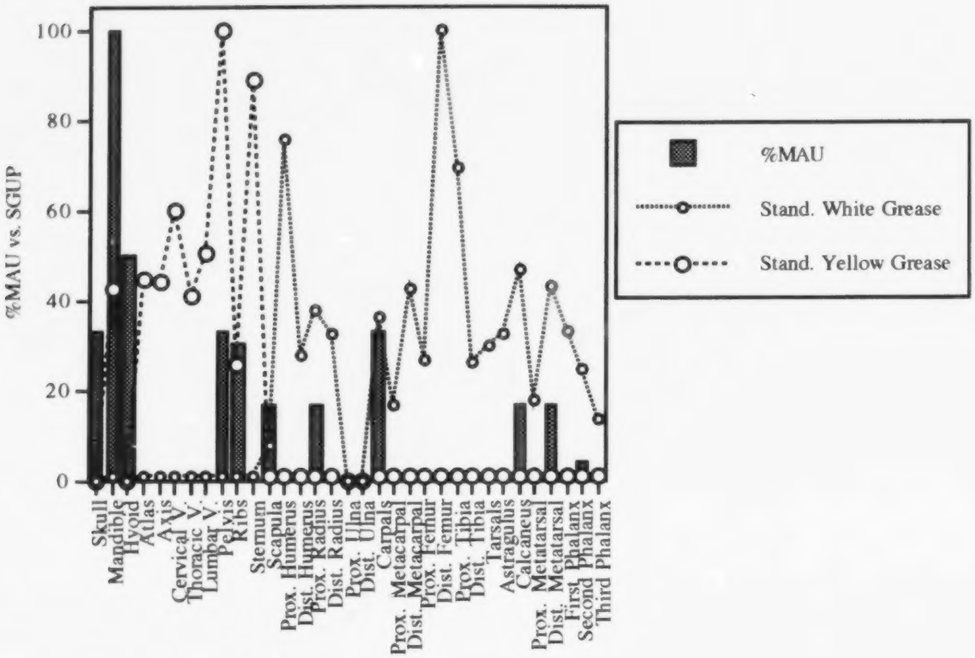


Figure 5.20. Bluenose Lake No. 6, Feature 15 Tent Ring and Component Two Designated by Stevenson: %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=-.1579, p=.380 Yellow Grease: Spearman's r=-.0623, p=.731



Bluenose Lake No. 6: Third Component

No strong correlations were discovered as a result of the statistical analysis of the inferred Bluenose Lake No. 6 third occupation. Correlations were made using element counts in Table 4.15. %MNEs versus the Whole Carcass Plot in Figure 5.21 yielded a rather weak correlation (Spearman's r=.3134, p=.098). The graph exhibits a loose fit with the expected plot, but it would seem likely that whole carcasses were not introduced into the site during this occupation.

Comparisons of the %MAU with the Standard Bulk Density Plot shown in Figure 5.22 resulted in a very weak correlation (Spearman's r=.0232, p=.905). Over representations of both high bulk density elements and very delicate elements such as the hyoid indicate factors aside from natural attrition at work. Human activity most likely played a large role in the assemblage patterning.

In Figure 5.23, %MAU versus the Meat Utility Index reflects another fairly weak correlation (Spearman's r=-.2501, p=.191). Elements possessing the highest meat utility values appear underrepresented. Elements of low and moderate meat utility also exhibit under representation. The plot demonstrates no real fit with the expected model, indicating that elements may not have been imported with a preference for meat utility.

Comparisons of the %MAU with the Marrow Utility Index in Figure 5.24 revealed a very weak correlation (Spearman's r=.1975, p=.304). High marrow utility elements appear under-represented, while moderate and low marrow value elements are over-represented.

Comparisons of %MAUs with the Standard Grease Utility Indices illustrated in Figure 5.25 yielded very weak correlations for both white (Spearman's r=-.0493, p=.799) and yellow (Spearman's r=-.0465, p=.739) grease. Elements possessing high white or yellow grease utilities are greatly under represented.

Stevenson's conclusion of a spring utilization for the third occupation at the Bluenose Lake No. 6 site is based upon the presence of fetal caribou remains, as well as the presence of a wide range of species diversity. However, the proximity of the site to a major caribou migration route which has been used during both spring and fall might also suggest a fall utilization. Presence of quantities of ground squirrel indicates their possible utilization as a food source during either spring or late summer as these periods tend to be the leanest in terms of food resources. Groups waiting for fall caribou migrations might rely upon a variety of species for sustenance during marginal periods.

Scapulae represent 40% of the maximum MAU for the assemblage, providing evidence contrary to the weak %MAU/Meat Utility correlations (Spearman's r=-.2501, p=.191) for the introduction of elements for meat utility. Postulating inverse relationships to be demonstrated by the utility plots would indicate that meat, marrow, and grease processing actually occurred, suggesting that high meat utility elements were at least sometimes introduced into the site, but at times were later destroyed during marrow and grease processing.

A few general conclusions may be drawn regarding activities at the third occupation from the Bluenose Lake No. 6 site based upon information drawn from the faunal assemblage, the statistical analysis, and observations of scapulae occurrence. Weak correlations of %MNE to the Whole Carcass Plots suggest introduction of partial rather than whole carcasses into the site, (or possibly some whole and some partial). Weak %MAU versus Bulk Density correlations suggest assemblage patterning was affected by more than natural processes; thus human activity likely affected the assemblage formation. Comparisons of %MAU with meat, marrow, and grease utility indices all revealed very weak correlations, indicating that elements were not selected for these utilities. However, by recognizing the inverse relationship demonstrated by the meat, marrow and grease plots (both white and yellow), it is possible to suggest that elements were being selected for processing, and being removed from the record through successive stages of reduction. Inverse relationships suggested by the utility plots may provide indirect evidence that gender-specific activities such as marrow and grease processing did occur (at least on occasion), and that the formation of the archaeological record was greatly influenced by the activities of women. This occupational division of the Bluenose Lake No. 6 site most likely represents both spring and fall occupations. The inhabitants probably relied upon a variety of species for subsistence prior to the caribou migrations.

Figure 5.21. Bluenose Lake No. 6, Component Three Designated by Stevenson: %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.3134, p=.098

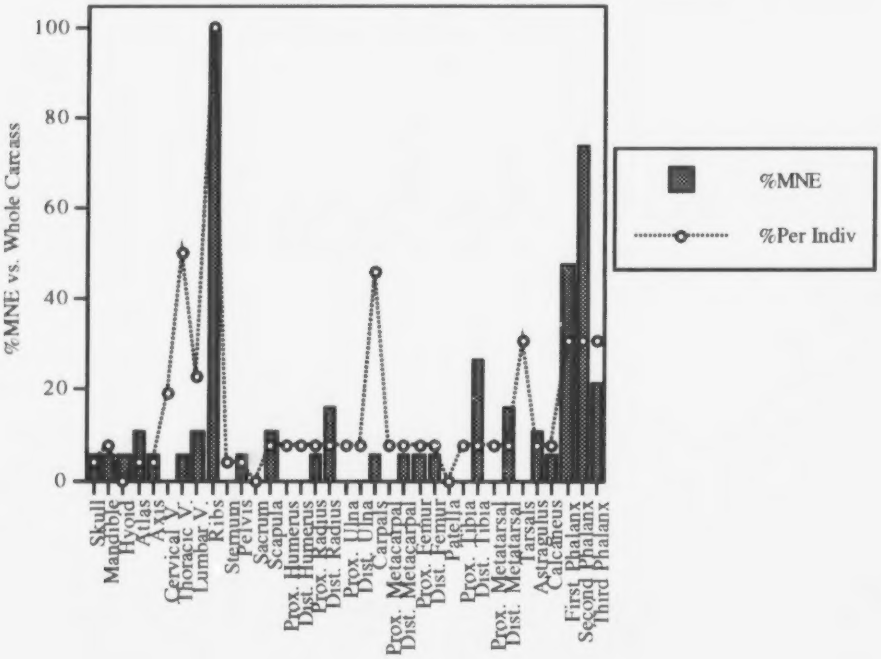


Figure 5.22. Bluenose Lake No. 6, Component Three Designated by Stevenson: %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.0232, p.905

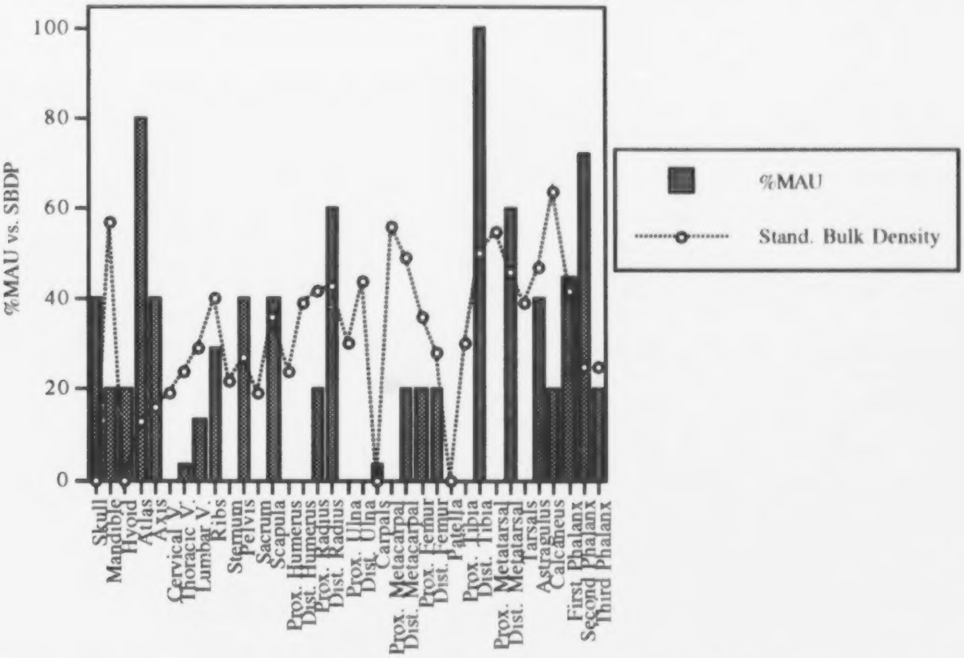


Figure 5.23. Bluenose Lake No. 6 Component Three Designated by Stevenson: %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.2501, p=.191

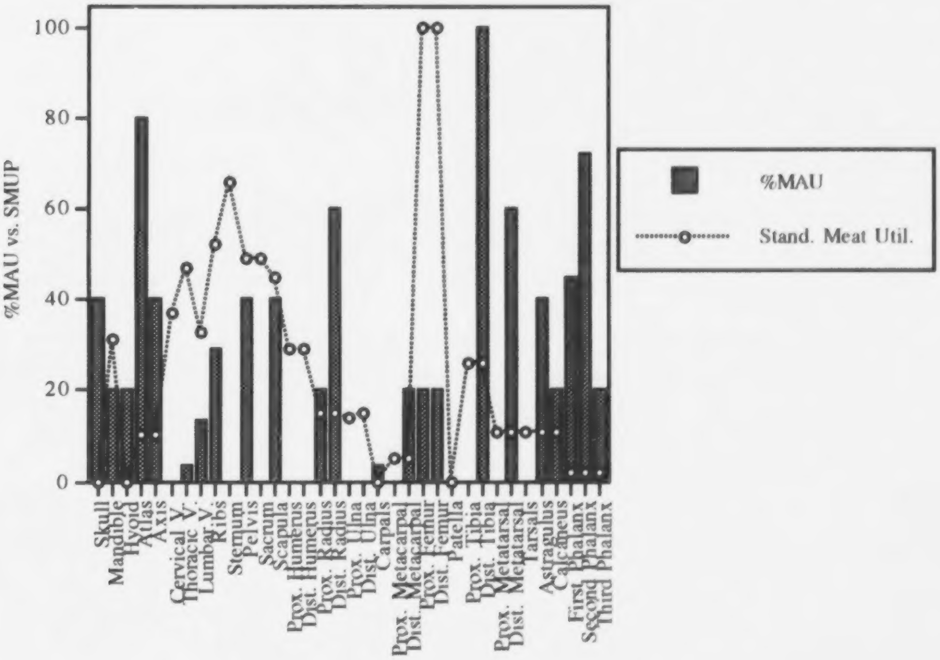


Figure 5.24. Bluenose Lake No. 6, Component Three Designated by Stevenson: %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=.1975, p=.304

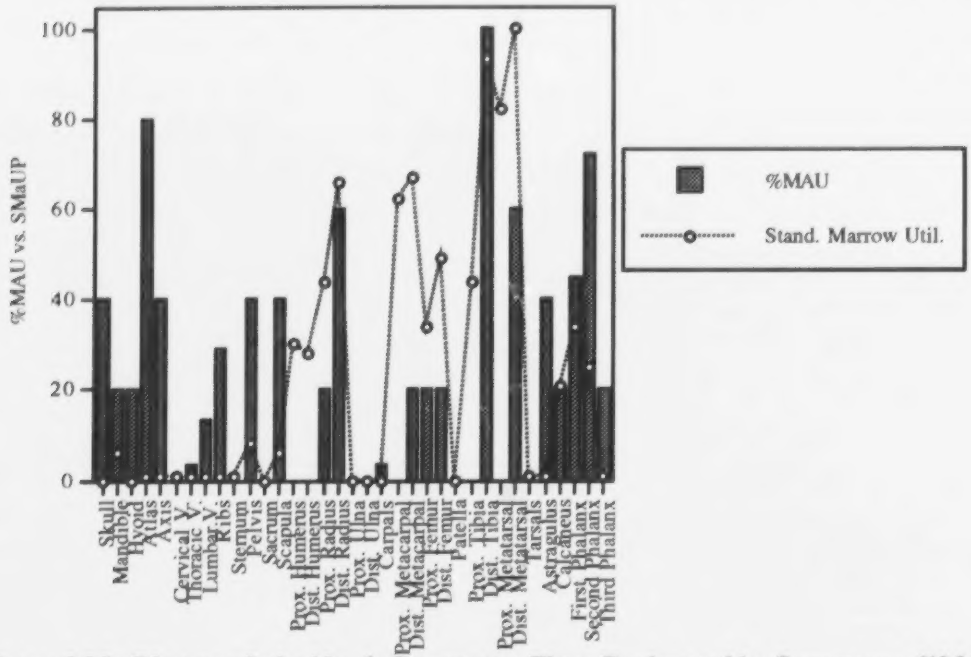
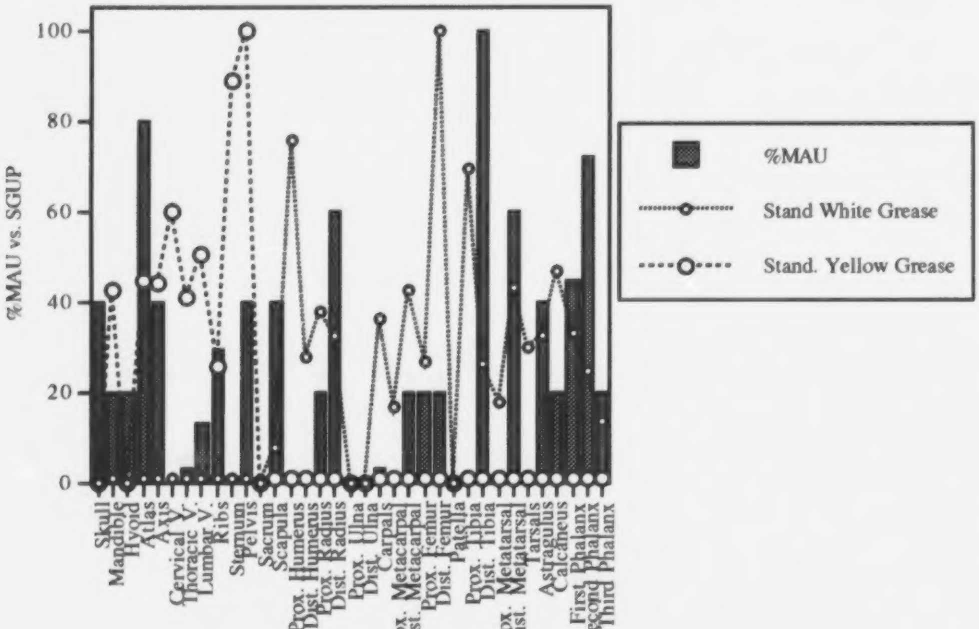


Figure 5.25. Bluenose Lake No. 6, Component Three Designated by Stevenson: %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=-.0493, p=.799 Yellow Grease: Spearman's r=-.0645, p=.739



Hornaday River No. 15

Results of the statistical analysis for the Hornaday River No. 15 site yielded a single strong correlation, using element counts derived in Table 4.16. Comparisons of %MNEs versus the Whole Carcass Plot in Figure 5.26 indicate a very strong correlation (Spearman's r=.5394, p=.001). The plot exhibits a close fit with the expected model, suggesting the introduction of whole carcasses into the site as a whole.

%MAUs were tested against the Standard Bulk Density Plot in Figure 5.27 revealing a weak correlation (Spearman's r=.1502, p=.404). High bulk density elements are under represented, while low bulk density elements remain over represented. Processes aside from natural attrition are suspected to contribute to the patterning of this assemblage. Human activity probably represents the major factor in the formation of this assemblage.

%MAUs were compared to the Standard Meat Utility Index in Figure 5.28, producing a very weak correlation (Spearman's r=.0220, p=.903). Elements possessing high meat utility exhibit under representation, while elements with low and moderate meat utility values demonstrate marked over representation. The %MAU/Meat Utility Plot does not fit with the expected model. The lack of high meat utility elements may reflect their removal for successive stages of marrow and grease processing or by transport away from the site. Alternatively, high meat utility elements may not have been introduced into the site; however, this seems unlikely as the whole carcass plot indicates that whole carcasses were in fact brought into the site.

Correlations for the %MAU/Marrow Utility Index appear weak in Figure 5.29 (Spearman's r=.2494, p=.095). Highest marrow utility elements are under represented. Conversely, elements possessing the lowest marrow utility are sharply over represented.

Comparisons of the %MAU with the Standard Grease Utility Index illustrated in Figure 5.30 showed weak correlations for both white and yellow grease (Spearman's r=.1676, p=.351, and Spearman's r=.1267, p=.482, respectively). Consistent over representations of low and moderate white and yellow grease utility elements coupled with under representation of high white and yellow grease utility elements may suggest a highly inverse relationship to the expected plot. This could indicate that grease production played a significant role in the formation of this assemblage.

Stevenson suggests a multi-seasonal occupation for the Hornaday River No. 15 site, probably from spring into early fall. Further examination of the faunal assemblage provided no evidence to the contrary. The presence of immature but not infant or fetal caribou may rule out a very early spring occupation.

Scapulae represent 47% of the maximum MAU for the entire site, indicating that elements of high meat utility were actually introduced into the site, despite a weak %MAU/Meat Utility correlation (Spearman's $r=.0220$, $p=.903$), which would suggest that elements were not introduced into the site solely for their meat values. By postulating the inverse of the %MAU Meat Utility Plot it appears reasonable to conclude that elements were introduced into the site based upon meat utility and later re-selected for marrow and grease processing. With the strong correlation between the %MNE and the Whole Carcass Plot, this seems likely

Based upon information obtained from the faunal assemblage, the statistical analysis, and observations concerning scapulae occurrences, some general conclusions may be reached regarding Hornaday River No. 15. A strong %MNE/Whole Carcass Plot correlation points to the introduction of whole carcasses into the site overall. The %MAU/Bulk Density Plot indicates the survival of less dense bones along with elements of high density, owing to probable human activity which is attributed with the assemblage formation. Weak correlation for meat, marrow, and grease utility plots could suggest that elements were not imported for these qualities. However, the inverse relationships of the correlations illustrated in the plots indicate that in fact marrow and grease processing activities were probably occurring. The inverse relationships also provide some of the only evidence for gender-related activities. Elements initially introduced into the site reflect decision making on the part of the hunter. Once introduced into the residence area, however, responsibility for and decisions regarding element processing enter women's domain, as suggested by the literature. Therefore, we may suggest that women were largely responsible for patterning of the faunal assemblage. If Stevenson's "immature" category indicates spring then this season is represented. If not, the occupation is probably only fall. Given the available data, the site may represent a multi-seasonal occupation, extending from the late spring into the fall, during which the occupants relied heavily upon caribou for subsistence.

Figure 5.26. Hornaday River No. 15, %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.5394, p=.001

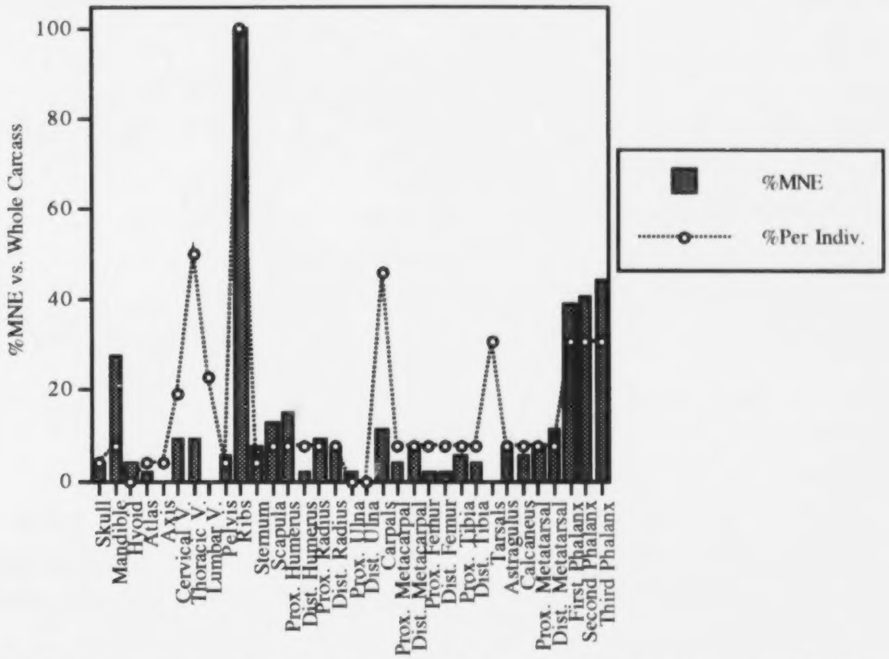


Figure 5.27. Hornaday River No. 15, %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.1502, p=.404

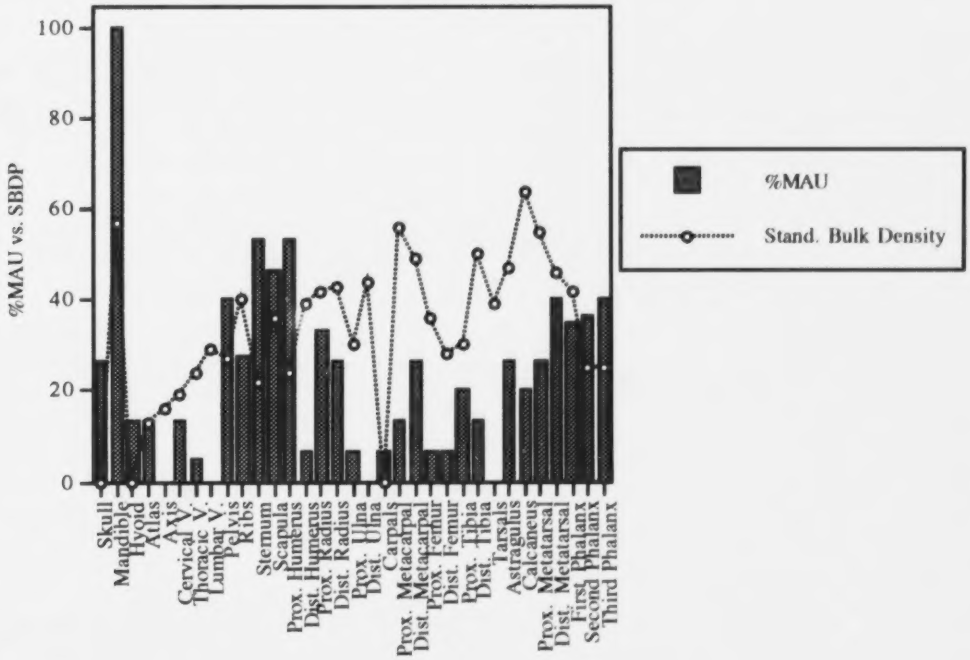


Figure 5.28. Hornaday River No. 15, %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=.0220, p=.903

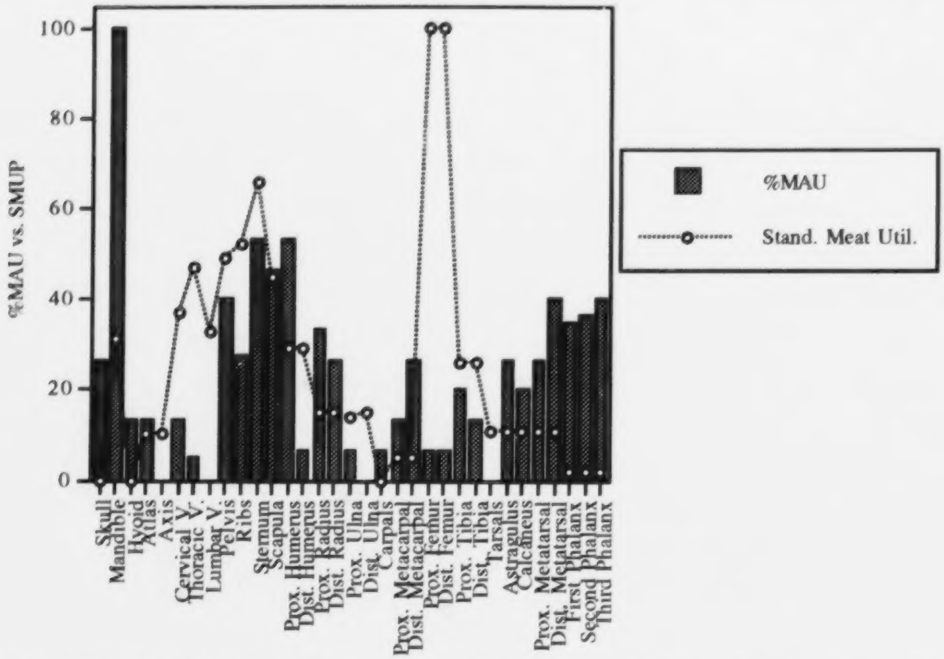


Figure 5.29. Hornaday River No 15 %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=.2494, p=.095

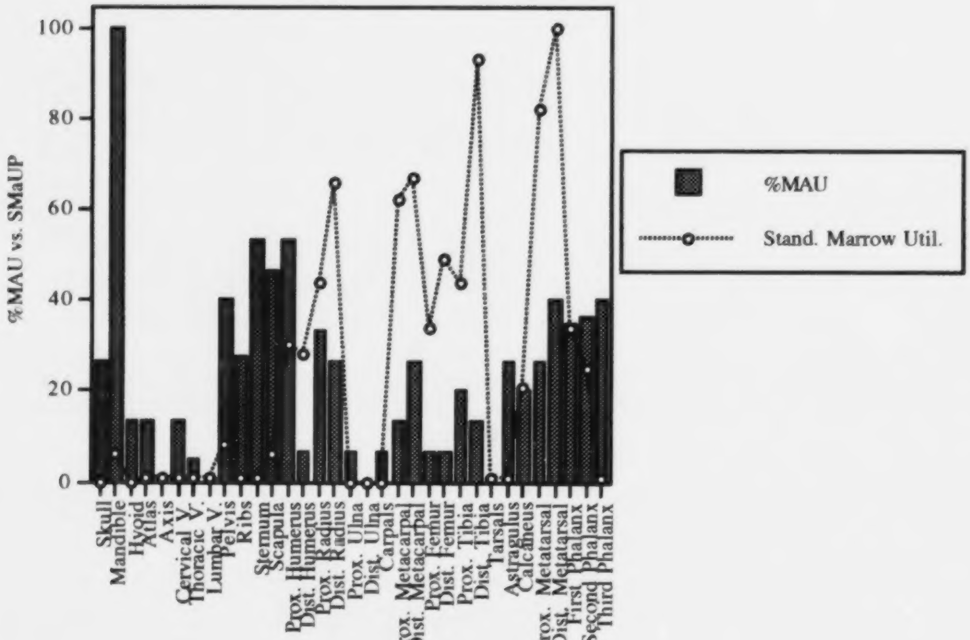
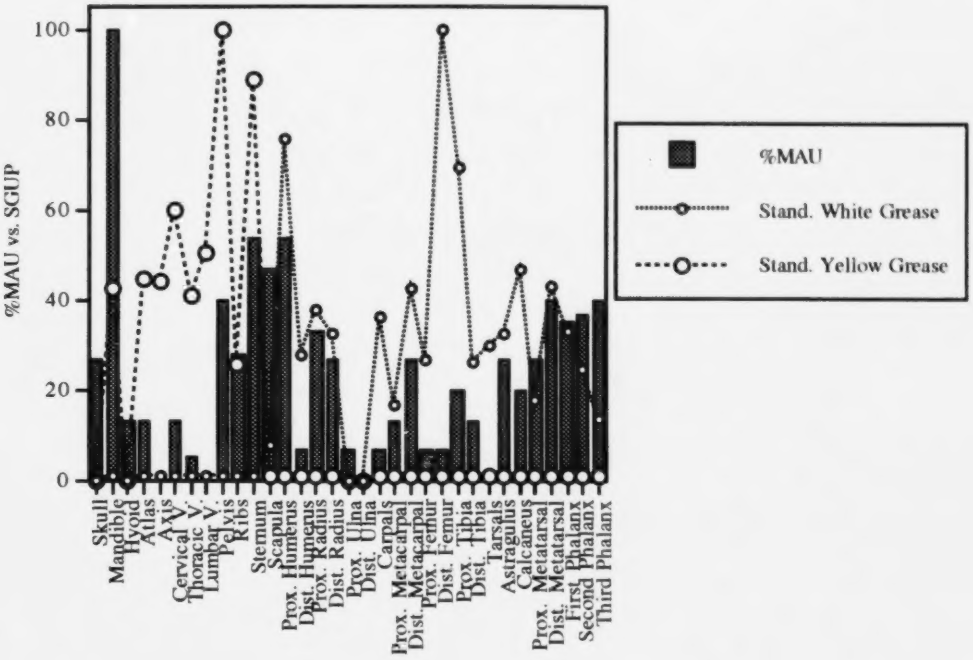


Figure 5.30. Hornaday River No. 15, %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=.1676, p=.351 Yellow Grease: Spearman's r=.1267, p=.482



Hornaday River No. 15: First Component

Statistical analysis of the faunal assemblage from Features 1, 2, 3, 5, 12, and 21, which comprise the first component designated by Stevenson, revealed no strong correlations for any of the tests, using element counts from Table 4.17. %MNEs were tested versus the Whole Carcass Plot illustrated in Figure 5.31, yielding a fairly weak correlation (Spearman's r=.2739, p=.111). The plot exhibits a less than ideal fit with the expected model, suggesting the introduction of partial, rather than whole, carcasses into the occupation, or the removal-along with attached meat-of some of the bones.

In determining the survivorship of bones within the assemblage, comparisons of the %MAU with the Standard Bulk Density Plot produced a weak correlation illustrated in Figure 5.32 (Spearman's r=.2124, p=.221), but the fit of the plot is somewhat similar to that of the expected model. High bulk density elements appear under represented, while low bulk density elements remain somewhat over represented. Agents aside from natural attrition, presumably human, appear responsible for assemblage composition.

%MAUs plotted against the Standard Meat Utility Index illustrated in Figure 5.33 yielded a very weak correlation (Spearman's r=-.1829, p=.293). High meat utility elements appear under represented, while low meat utility elements are over represented.

The plot shows no real fit with the expected model, suggesting that high meat utility elements were not introduced into this assemblage.

Comparisons of %MAU with the Marrow Utility Index shown in Figure 5.34 revealed a weak correlation (Spearman's r=.1185, p=.498). The plot illustrated a sharp under representation of high marrow utility elements, and a poor fit with the expected model. Initially it appears that elements were not being selected for their marrow utility. However, postulating an inverse relationship suggests that reduction of marrow yielding bones and their removal from the faunal assemblage is possible.

%MAUs were plotted versus the Standard Grease Utility Indices for white and yellow grease in Figure 5.35, with very weak or weak correlations resulting(Spearman's r=.0298, p=.865, and Spearman's r=-.2257, p=.192 respectively). Both comparisons showed over representation of low grease utility elements, and under representations of high grease utility elements. Neither the white nor yellow grease plot exhibited a fit similar to the expected models, suggesting that elements were not chosen for white or yellow grease utility values.

Stevenson offers an estimate of spring utilization for the first occupation at the Hornaday River No. 15 site, based upon the presence of fetal and subadult caribou remains. Further investigations here also suggest a spring occupation. The presence of ground squirrel, a species commonly utilized as a food source during the lean periods in spring and fall prior to caribou migrations, as well as the presence of loon support the spring hypothesis.

Observations of the presence of scapulae may provide additional clues to the site's seasonality. Scapulae represent 100% of the maximum MAU of the faunal assemblage, providing strong evidence for the introduction of high meat utility elements into the site. However, %MAU/Meat Utility correlations yielded a poor fit, (Spearman's r=-.1829, p=.293) suggesting the contrary. If the site represents a spring occupation, high meat utility elements were probably introduced into the site rather than elements possessing moderate or low meat utility but high marrow or grease utility. In a spring occupation, it is unlikely that large scale marrow and grease processing was conducted, unless the inhabitants were in desperate need for marrow and grease.

Based upon statistical analysis, observations of scapulae occurrence, and information obtained through faunal analysis, several conclusions may be made regarding the first occupation at the Hornaday River No. 15 site. A fairly weak correlation for the %MNE/Whole Carcass Plot as well as a poor fit of the plot to the expected model suggest that whole carcasses were not introduced into the first occupation, or that some parts were later removed. %MAU/Bulk Density correlations proved weak, suggesting that factors aside from natural attrition were responsible for assemblage patterning. Human activity is considered a primary formation process during the first occupation. Weak correlations for %MAUs versus meat, marrow and grease utility plots suggest that elements were not selected for any of these qualities. However, observation of inverse relationships of the plots indicate that in fact meat, marrow, and grease processing activities may have been conducted on the partial carcasses introduced, playing a crucial role in the generation of the faunal assemblage. The same inverse relationships also provide indirect evidence for gender-related activities - those of meat, marrow, and grease processing, which are recognized as women's responsibilities. Based upon this scanty evidence, it is suggested that women were highly influential in generating the faunal assemblage. Proportions of scapulae to other skeletal elements attest to the introduction of high meat utility elements despite weak %MAU/Meat Utility correlations and tend to negate the possibility that dried meat and attached bones were later removed. A spring occupation with substantial marrow and grease production activities despite the poor quality of the carcasses-indicating near starvation conditions for the inhabitants, is suggested for the first occupation at the Hornaday River No. 15 site.

Figure 5.31. Hornaday River No. 15, Component One Designated by Stevenson: %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.2739, p=.111

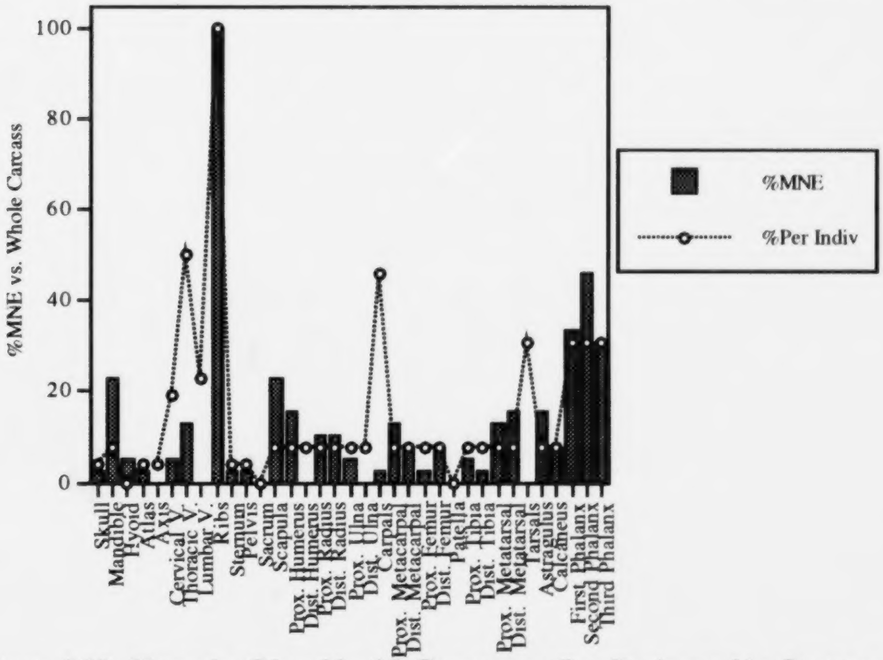


Figure 5.32. Hornaday River No. 15 Component One Designated by Stevenson: %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.2124, p.221

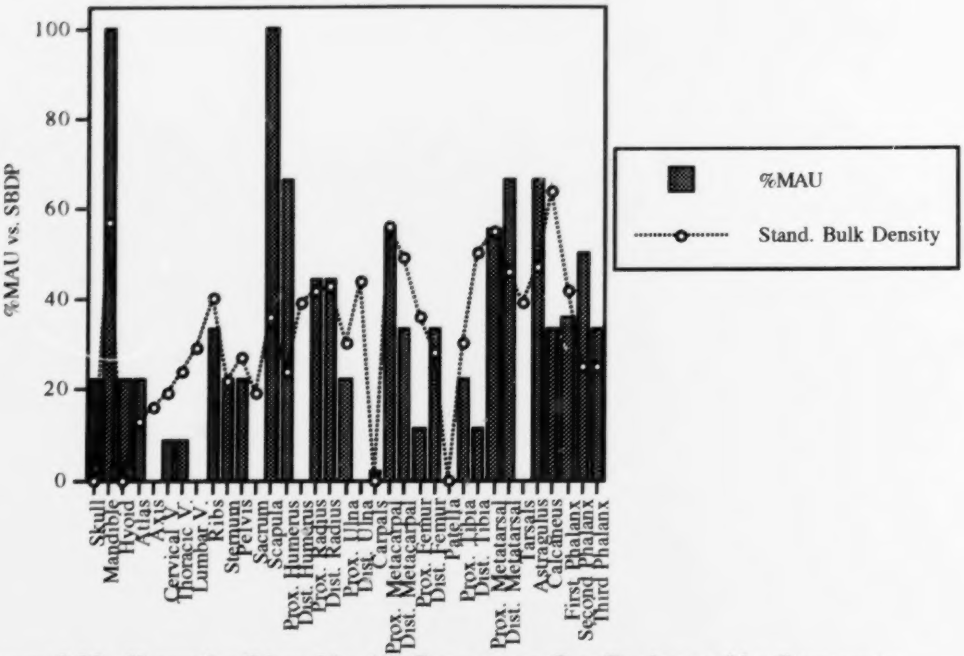


Figure 5.33. Hornaday River No. 15, Component One Designated by Stevenson: %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.1829, p=.293

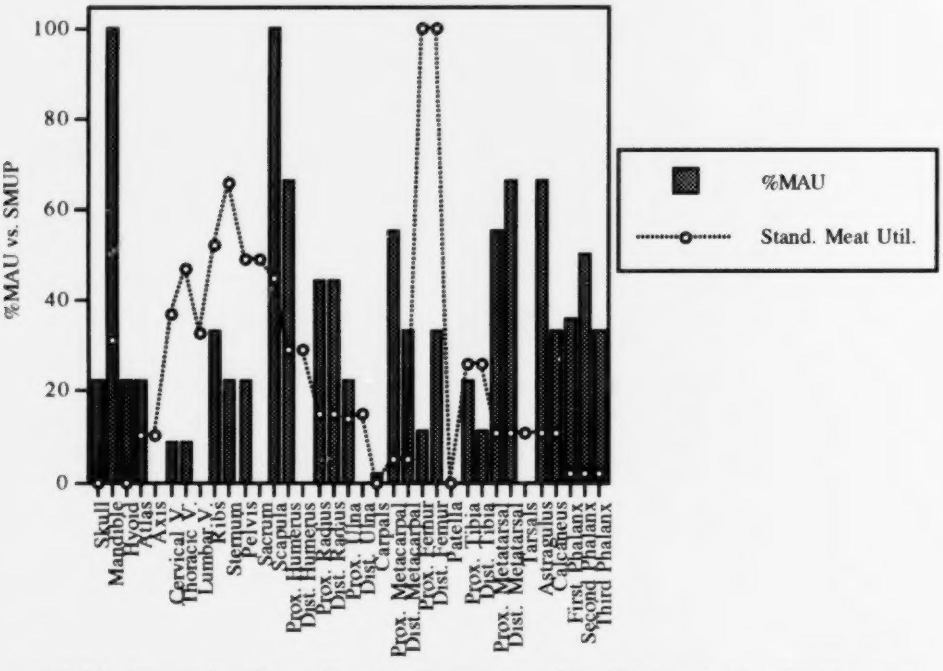


Figure 5.34. Hornaday River No. 15, Component One Designated by Stephenson: %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=.1185, p=.498

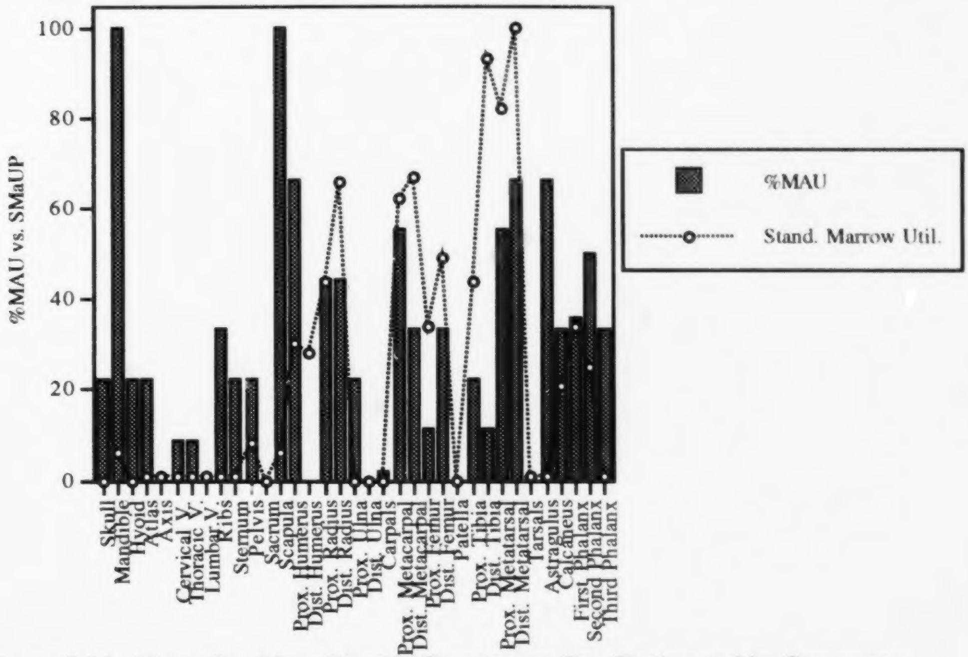
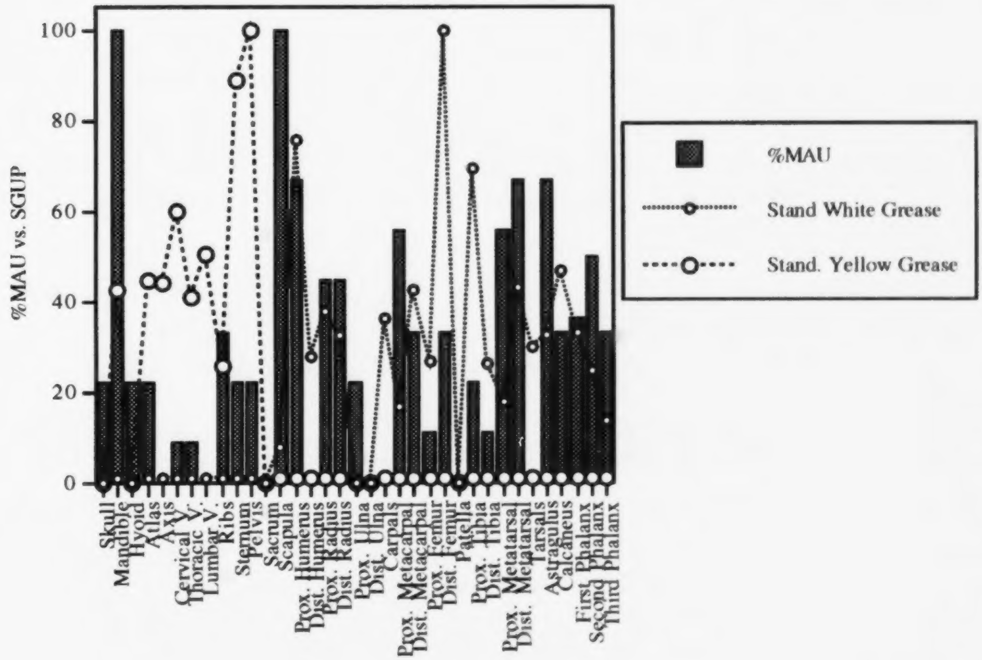


Figure 5.35. Hornaday River No. 15, Component One Designated by Stevenson: %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=.0298, p=.865 Yellow Grease: Spearman's r=-.2257, p=.192



Hornaday River No. 15: Feature 4 (Second Component)

Analysis of the data resulted in no significant statistical correlations. Comparisons of %MNE with the Whole Carcass Plot in Figure 5.36 yielded a slightly weak correlation (Spearman's r=.2955, p=.113). This correlation, as well as the poor fit of the plot with the expected model, suggests that whole carcasses may not have been introduced into the site at that time, or that parts of carcasses may have been removed selectively, possibly after the attached meat was dried.

In attempting to determine the survivorship of skeletal elements, %MAUs were contrasted with the Standard Bulk Density Plot in Figure 5.37 resulting in another very weak correlation (Spearman's r=-.0106, p=.956). The plot exhibits an over representation of low bulk density elements. High and moderate bulk density elements appear inconsistently under and over represented. Human activity appears responsible for the formation of this assemblage.

%MAUs were plotted versus the Standard Meat Utility Index in Figure 5.38, which provide a very weak correlation (Spearman's r=.0620, p=.745). The plot exhibits no real fit with the expected model. Femurs appear under represented while most other elements are over represented. Elements of very low meat utility are drastically over represented. The plot suggests that elements were not selected for their meat utility, which is unlikely considering the presence of some high meat utility elements such as sternum, pelvis, and scapula.

Comparisons of %MAU versus the Marrow Utility Index illustrated in Figure 5.39 yielded a very weak correlation (Spearman's r=-.0491, p=.797). A strong under representation of high utility elements, combined with an over representation of low marrow utility elements indicates that elements were not selected for their marrow values. The lack of high marrow utility elements and the very weak correlation are suggestive of a highly inverse relationship in which high value marrow elements were destroyed after being brought into the site.

%MAUs were compared to the White and Yellow Grease Utility Indices in Figure 5.40 with little success. Weak correlations were derived for white grease (Spearman's r=-.2273, p=.227) and yellow grease (Spearman's r=.0968, p=.611). High white and yellow grease utility elements show strong degrees of under representation. Moderate and low white and yellow grease utility elements exhibit over representation, suggesting a highly inverse relationship. It is possible to suggest that grease production could have been a significant factor in the patterning of this assemblage.

Stevenson proposes a fall or early winter occupation for Feature 4. This estimate seems likely and is supported within this thesis, with further investigations of the faunal assemblages indicating nothing to the contrary. The absence of fetal caribou, and the presence of numerous subadult and adult caribou would tend to strengthen this estimate. The occurrence of ground squirrel, a species utilized for food during leaner periods may also indicate a late summer or fall site utilization. Stevenson's estimate of a fall occupation appears reasonable.

Scapulae represent 33.33% of the maximum MAU for the Feature 4 occupation, providing evidence for the introduction of high meat utility elements. %MAU/Meat Utility correlations appear very weak (Spearman's r=.0620, p=.745). The weak meat utility correlation would indicate that elements were not introduced into the site based upon their meat utility. However, the presence of scapulae somewhat negates this suggestion, as they possess a fairly high meat utility. A higher proportion of scapulae than those observed might then be expected. Scapulae may have been introduced into the site, and then later removed through the transportation of bone-in dried meat. Binford and Bertram observed that scapulae and pelves were among two of the most common bones to be dried with the meat on them (1977:84).

Based upon the faunal analysis, statistical correlations, and clues provided by observations of scapula occurrence, a few general conclusions may be drawn regarding Feature 4. Weak correlations between the %MNE and the Whole Carcass Plot suggest that whole carcasses were not always introduced into the site or that selected elements were later removed. Weak %MAU/Bulk Density correlations and inconsistent representation of high and low bulk density elements lead to the conclusion that human activity is the probable cause for the formation of the faunal assemblage. Weak correlations and poor fits of the plots to expected meat, marrow and grease (both white and yellow) models initially indicate that elements were not being selected for these activities. However, consideration of the possible inverse relationships demonstrated by these plots yield two very important clues. First, the inverse relationships would indicate that meat, marrow and grease processing activities actually took place. Second, if these activities which are generally considered women's duties were actually conducted, the relationships provide a bit of indirect evidence for the role of women in affecting the generation of the faunal assemblage. Both observations of faunal data and scapulae occurrences point to a fall occupation with a heavy reliance upon caribou for meat as well as marrow and grease. Processed, dried meat is likely to have also been removed from the area.

Figure 5.36. Hornaday River No. 15, Feature 4, Component Two Designated by Stevenson: %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.2955, p=.113

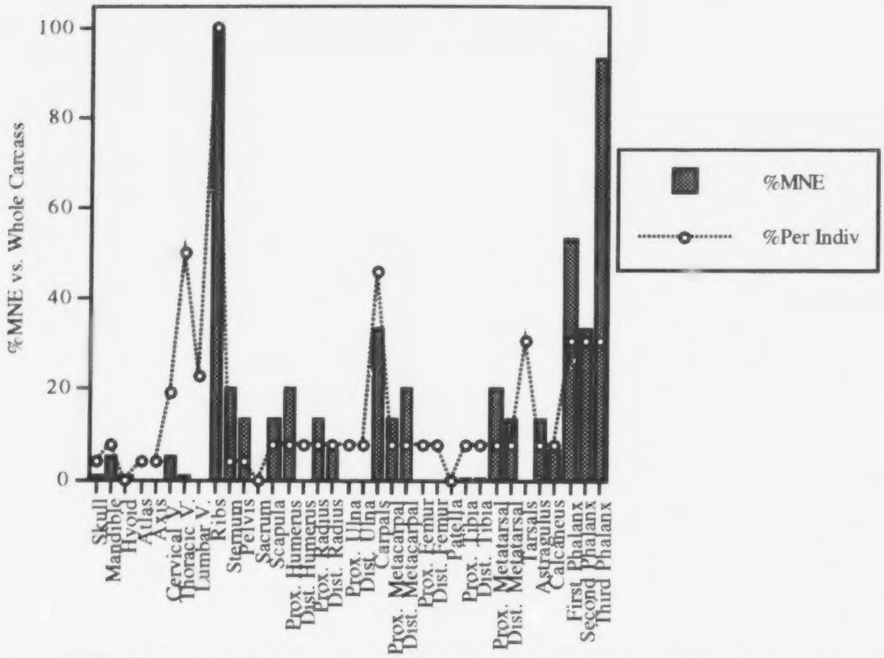


Figure 5.37. Hornaday River No. 15, Feature 4, Component Two Designated by Stevenson: %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=-.0106, p=.956

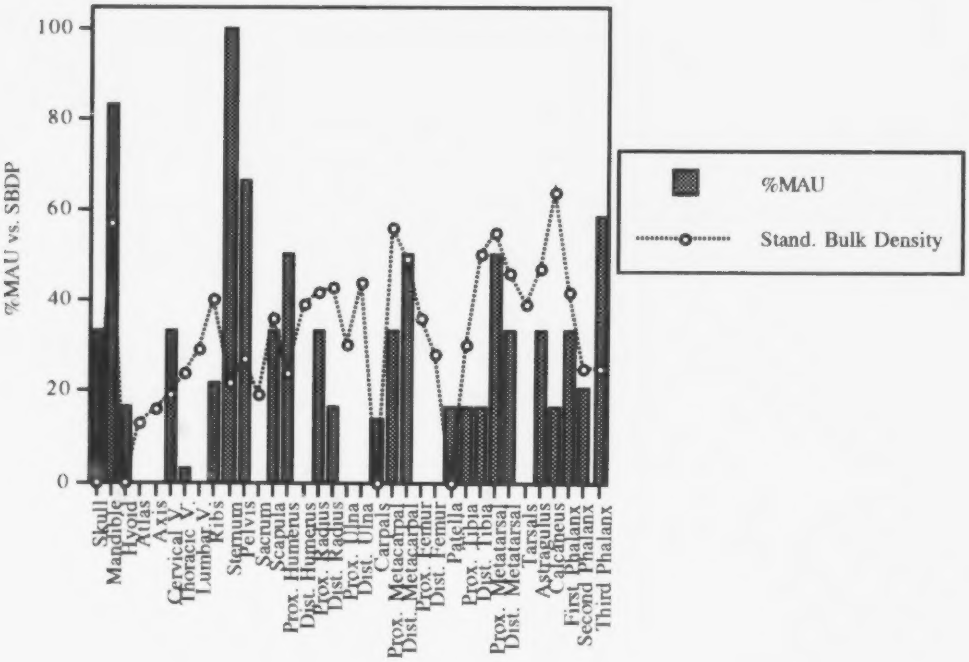


Figure 5.38. Hornaday River No. 15, Feature 4, Component Two Designated by Stephenson: %MAU / Standard Meat Utility Plot by skeletal Element Spearman's r=.0620, p=.745

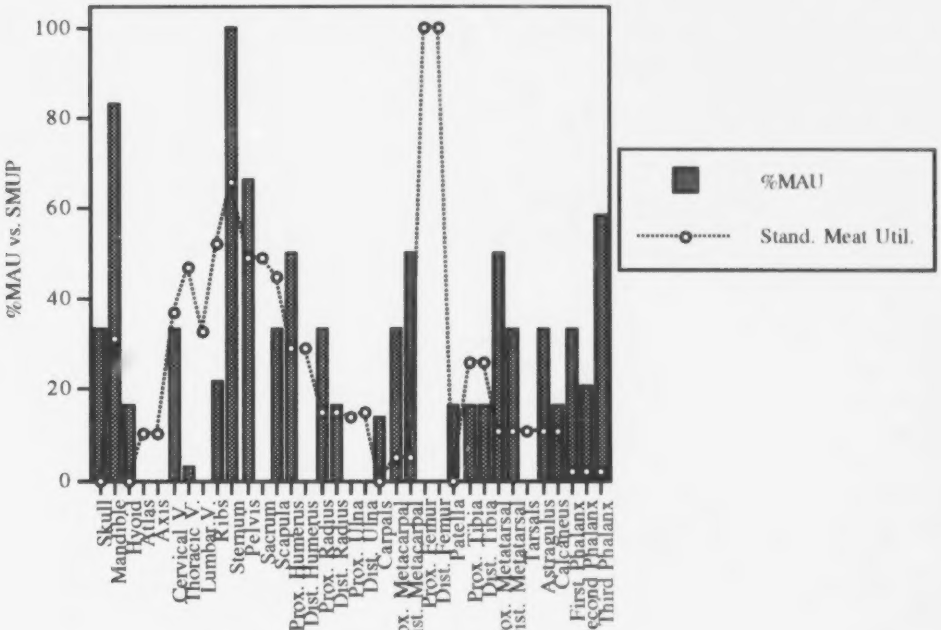


Figure 5.39. Hornaday River No. 15, Feature 4, Component Two Designated by Stevenson: %MAU / Standard Marrow Utility Plot Spearman's r=-.0491, p=.797

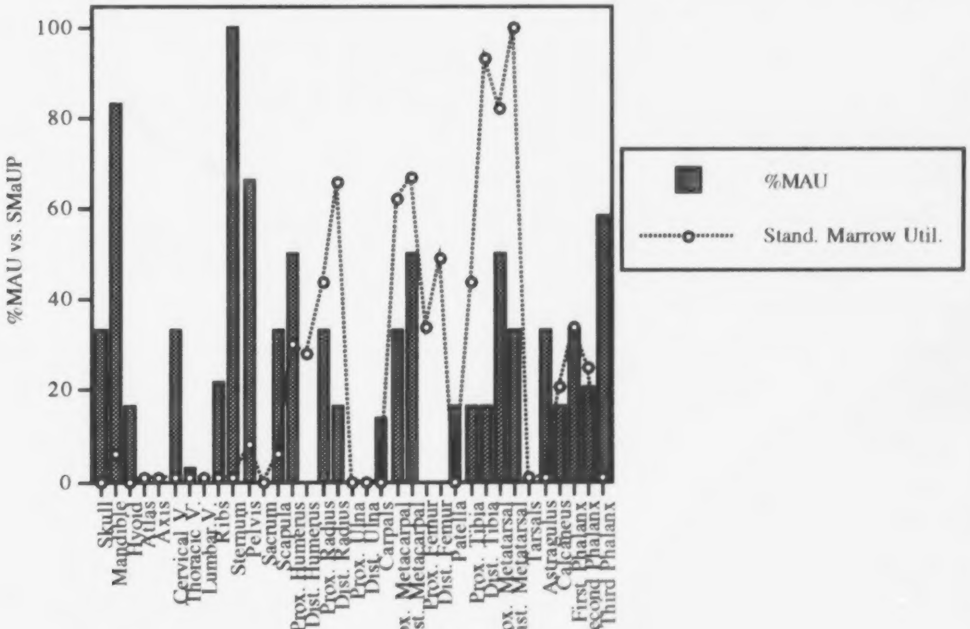
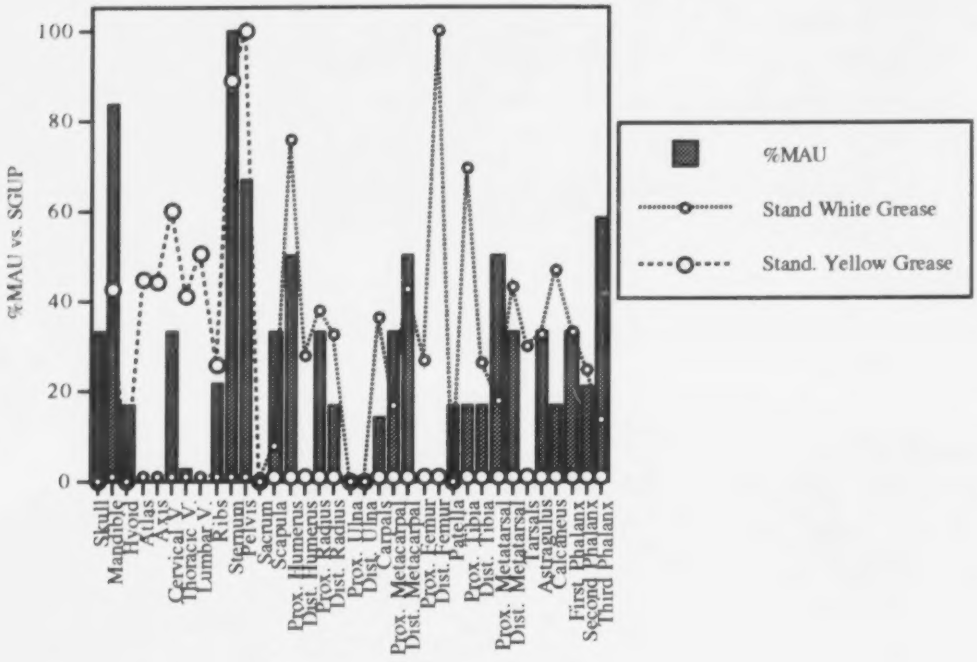


Figure 5.40. Hornaday River No. 15, Feature 4, Component Two Designated by Stevenson: %MAU / Standard Grease Utility Plot White Grease: Spearman's r=-.2273, p=.227 Yellow Grease: Spearman's r=.0968, p=.611



Hornaday River No. 15: Feature 1 (Tent Ring)

Statistical analysis using element counts presented in Table 4.19 yielded a single significant correlation. To determine the probability of whole carcass introduction, %MNEs were compared with the Whole Carcass Plot in Figure 5.41, resulting in a very weak correlation (Spearman's r=-.0331, p=.855). The plot exhibits no real fit with the expected model, suggesting that partial rather than whole carcasses were introduced into the site, or that selected parts were later removed.

Comparisons of %MAUs with the Standard Bulk Density Plots revealed a strong correlation illustrated in Figure 5.42 (Spearman's r=.3401, p=.053). The plot somewhat resembles the expected model even though highest bulk density elements appear under represented and low bulk density elements exhibit over representation. It would appear that natural attrition was instrumental in assemblage patterning. Human activities are also suggested to be patterning factors, perhaps accounting for the pattern of representation of high and low bulk density elements.

%MAUs compared against the Standard Meat Utility Index in Figure 5.43 provide no strong correlation (Spearman's r=.1041, p=.564). High meat utility elements appear under represented, while low and medium meat utility elements remain over represented.

The plot exhibits no fit with the expected model. This plot would indicate that high meat utility elements were not introduced into the tent ring.

Comparisons of %MAU against the Marrow Utility Index illustrated in Figure 5.44 indicate a weak correlation (Spearman's r=.2572, p=.148). High marrow utility elements are under represented. Low to medium marrow utility elements demonstrate over representation. The plot exhibits no real fit with the expected model, suggesting that elements were not selected for their marrow utility. Removal through marrow or grease processing may account for the apparent under representation of high marrow utility elements.

%MAUs compared against the White and Yellow Grease Utility indices shown in Figure 5.45 resulted in weak correlations (Spearman's r=.1895, p=.291, and Spearman's r=-.0234, p=.897, respectively). High white and yellow grease utility elements appear under represented while low and moderate white and yellow grease elements exhibit consistent over representation.

Gender-related activities may be interpreted from this feature using indirect evidence provided by the inverse relationships discussed for the meat, marrow, and grease utility plots. Essentially, the negative evidence provides an argument for gender-related or gender-specific activities within Feature 1. It is suggested that women played an integral role in the formation and patterning of the faunal assemblage through their carcass processing activities.

Stevenson suggests that Feature 1 represents a spring occupation. He does not address Feature 1 directly, but includes it in the seasonality estimate for the first occupation. Further investigation of the faunal assemblage yielded no information contrary to Stevenson's conclusion. A spring occupation seems quite probable.

Scapulae represent 50% of the maximum MAU for the site. A high percentage of scapulae in the assemblage, which possess relatively high meat utility values but low marrow and grease utility, suggests the introduction of meat utility elements into the site despite the low %MAU/Meat Utility correlation (Spearman's r=.1041, p=.564) which indicates the opposite. High proportions of scapulae in the assemblage may point to a spring occupation.

Based upon results of faunal analysis, statistical comparisons, and observations of scapulae occurrence, it is possible to draw some general conclusions regarding the tent ring labeled Feature 1 at the Hornaday River No. 15 site. Weak %MNE/Whole Carcass correlations, along with a poor fit of the plot to the expected model indicates the introduction of partial rather than whole carcasses into the site, or the later partial removal of elements from the site. %MAU comparisons versus the Standard Bulk

Density provided a strong correlation, suggesting that human activity as well as natural attrition were instrumental in assemblage patterning. While the plot somewhat resembles the expected model, inconsistent representations of very dense elements suggests human interference. Weak correlations for meat, marrow, and grease utility indices initially indicated that elements were not chosen for meat, marrow, or grease qualities. By postulating highly inverse relationships created by weak correlations, a strong indication for meat, marrow, and grease processing activities becomes possible. Absences of high utility elements may be explained by their destruction through successive stages of reduction. Highly inverse relationships created by the weak correlations also provide indirect evidence for gender-related activities, such as meat, marrow, and grease processing activities within the residential area which are traditionally recognized as women's responsibilities. Decisions made regarding the selection of elements for marrow and grease processing, and the resultant removal of elements from the assemblage could then probably be attributed to women. Consequently, the assemblage recovered from Feature 1 was probably generated largely by women. Scapulae represent 50% of the maximum MAU of the Feature 1 assemblage, suggesting (contrary to the weak correlation for the %MAU Meat Utility Index Plot), that high meat utility elements were introduced into the site. Large proportions of scapulae in the assemblage may provide a clue toward a spring occupation. Elements high in meat were probably introduced into the site over elements high in marrow and grease during the spring as marrow and grease would be of poorer quality and less desirable for consumption. A spring occupation is suggested for the site, partially based upon the high proportions of scapulae to other elements, and partially based upon the presence of fetal caribou elements. As was the case in interpreting the entire first occupational component, I suggest that the analysis is indicative of a near starvation situation where even poor carcasses were extensively processed for marrow and grease.

Figure 5.41. Hornaday River No. 15, Feature 1 Tent Ring: %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=-.0331, p=.855

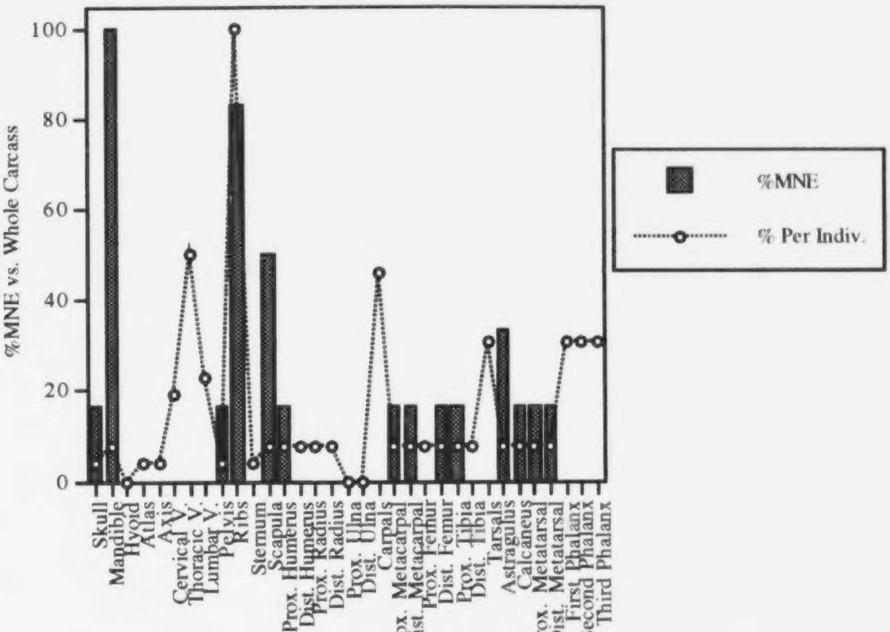


Figure 5.42. Hornaday River No. 15, Feature 1 Tent Ring - %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.3401, p=.053

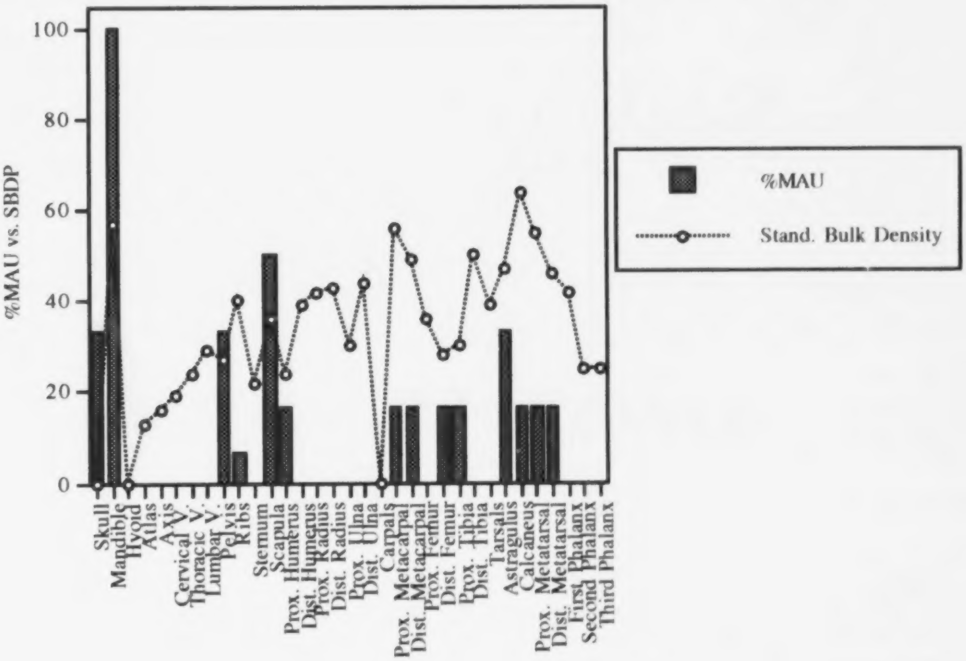


Figure 5.43. Hornaday River No. 15, Feature 1 Tent Ring - %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=.1041, p=.564

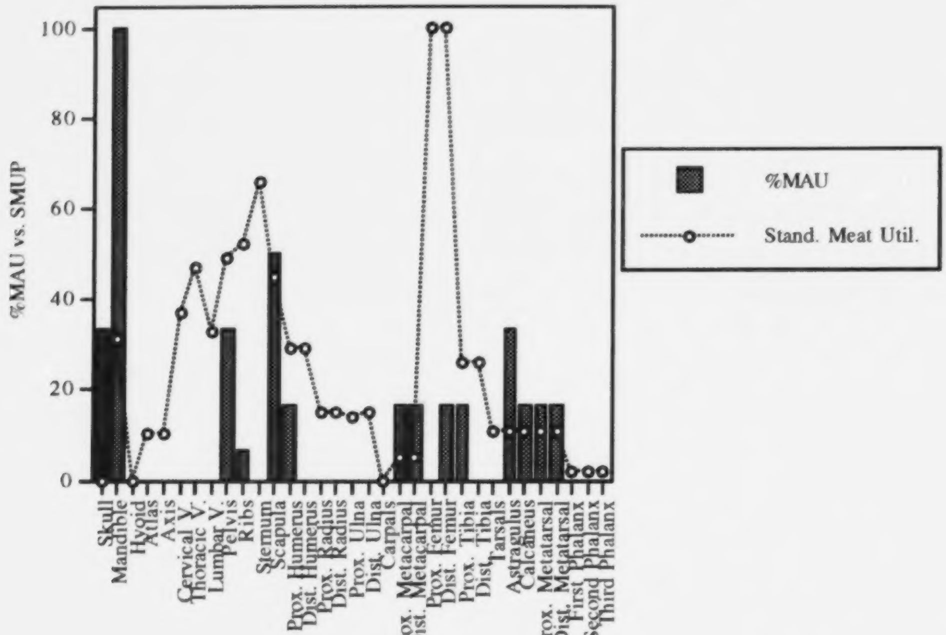


Figure 5.44. Hornaday River No. 15, Feature 1 Tent Ring - %MAU/ Standard Marrow Utility Plot by Skeletal ElementSpearman's r=.2572, p=.148

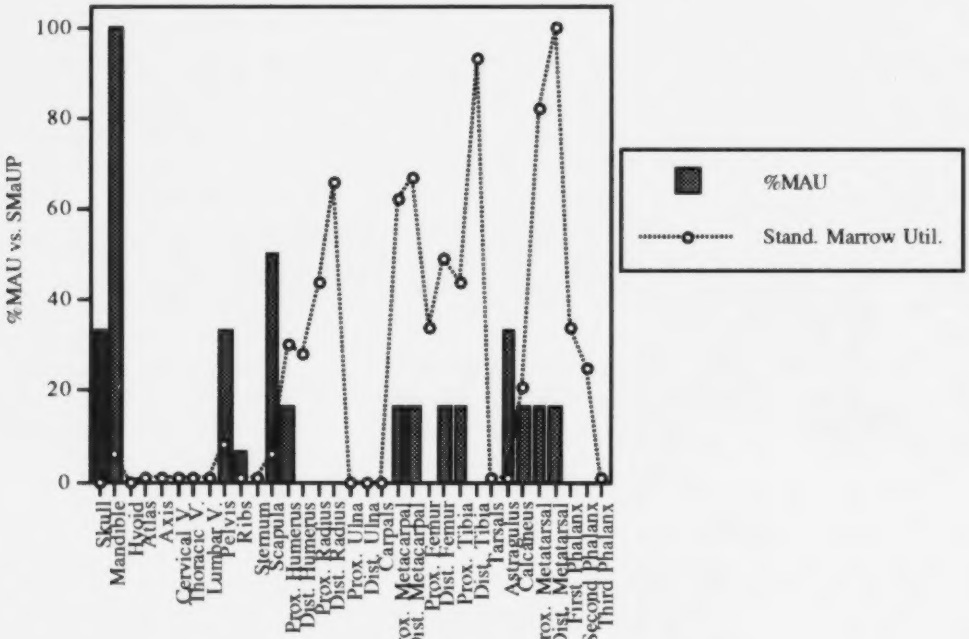
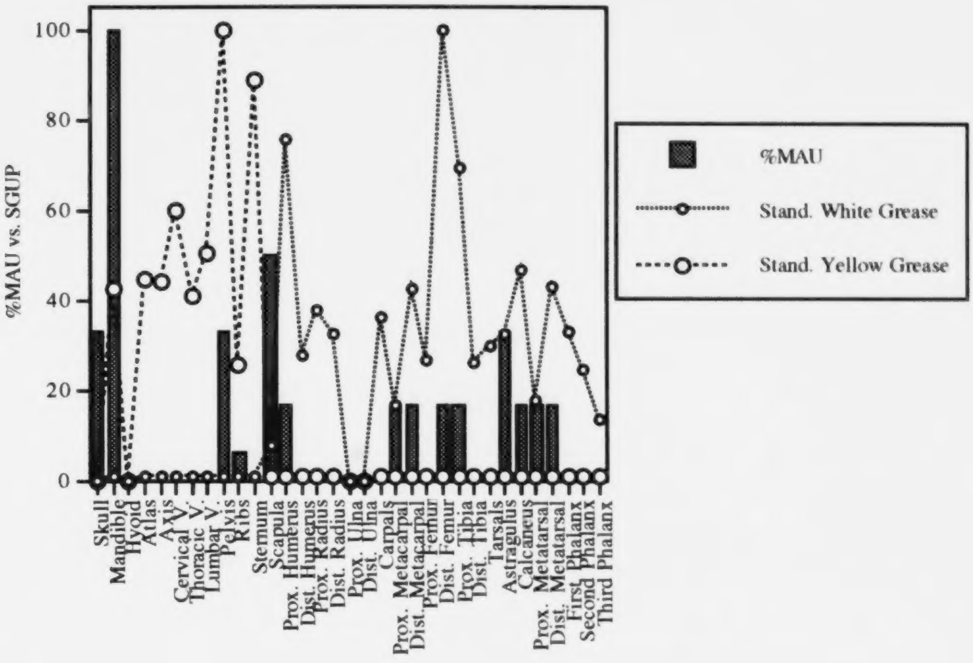


Figure 5.45. Hornaday River No. 15, Feature 1 Tent Ring - %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=.1895, p=.291 Yellow Grease: Spearman's r=-.0234, p=.897



Hornaday River No. 15: Feature 12 (Hunting Blind)

Statistical analysis of the hunting blind utilizing element counts provided in Table 4.20 revealed two significant correlations. %MNEs were compared to the Whole Carcass plot in Figure 5.46 to determine whether or not whole carcasses were introduced into the site. A strong correlation (Spearman's r=.3896, p=.025), suggests whole carcass introduction into the site

Comparisons of the %MAU with the Standard Bulk Density to test for bones' survivorship also revealed a strong correlation in Figure 5.47 (Spearman's r=.4092, p=.018). Despite the strong correlation, there is still a general under representation of high and medium density elements. The under representation of limb elements might be explained by their selection for marrow and grease processing, and thus their removal from this assemblage. Factors other than natural attrition do appear to be influential in the patterning of the assemblage. Human interference is partially credited with the formation of this assemblage.

%MAUs were plotted versus the Standard Meat Utility Index illustrated in Figure 5.48 yielding a weak correlation (Spearman's r=-.1932, p=.281). The plot exhibits no fit with the expected model. High meat utility elements are strongly under represented, while low and moderate meat utility elements are over represented. This type of relationship comes as no surprise when considering the probability that the site represents a hunting stand. Binford (1978) documented the types of elements retained or transported to hunting stands as being those generally low in meat utility, but relatively high in marrow utility (i.e., carpals, metacarpals, etc.). The lack of high meat utility elements within the Feature 12 assemblage may be explained by their removal from the hunting stand (assuming that they were ever introduced) to the residential area, or to a cache away from the hunting stand.

%MAU comparisons with the Standard Marrow Utility Index shown in Figure 5.49 indicates another weak correlation (Spearman's r=.3070, p=.082). High marrow utility elements appear strongly under represented, whereas low and moderate marrow utility elements exhibit marked over representation. The plot demonstrates a poor fit with the expected model. Such a poor relationship of the plot with expected models would indicate that marrow processing activities were not conducted at the site. But a close fit of the plot to the proposed model would not be expected if marrow processing were actually being conducted. An assemblage in which elements were being destroyed for marrow extraction should primarily contain large numbers of low marrow utility elements, and very few high marrow utility elements Therefore, if the inverse relationship demonstrated by the plot is postulated, it appears likely that marrow processing probably occurred.

Comparisons of %MAUs against Standard Grease Utility Indices for white and yellow grease produced weak correlations illustrated in Figure 5.50 (Spearman's r=.1868, p=.298, and Spearman's r=-.2542, p=.153, respectively). Elements possessing high white and yellow grease utility values exhibit under representation in the Feature 12 assemblage. Elements of low and moderate white and yellow grease utility show over representation. Neither white nor yellow grease plots show fits with expected models. Poor fits with expected models coupled with the weak correlations indicate that there was not a selection for high grease bones.

Evidence for gender-specific activities strongly indicates activities associated with men, but provides very little evidence for activities associated with women. Inverse relationships created by utility plots provide indirect evidence for carcass processing activities (meat, marrow, and grease), commonly acknowledged as women's responsibilities. While very similar patterns are noted for previously discussed sites and features, Feature 12 possesses certain characteristics which differentiate from those primarily residential sites. Thus the conclusions drawn for previous patterns demonstrated by inverse relationships illustrated in the utility plots take on a different meaning here.

Feature 12 is designated as a hunting blind/windbreak by Stevenson (1992:136-138) based upon the following evidence. The L-shaped feature overlooks the river and the surrounding valley, commanding a good view of approaching caribou herds. Artifacts recovered from the feature provide evidence for tool manufacture and repair, with all stages of lithic processing being represented. Faunal remains exhibit large numbers of marrow-split longbones, especially metacarpals and metatarsals.

Feature 12 exhibits many of the same characteristics described by Binford (1978) for spring intercept hunting stands, in which he denotes three types of features identified at the hunting stands: observation/shooting points, butchering areas, and conversational/consumption areas. Observation points are characterized by having a good view of the surrounding area, small hearths, a windbreak, lots of industrial debris, and very little consumption debris. Butchering areas are located away from the line of the caribou's vision. All butchering and caching activities are conducted at this area. Conversational/consumption areas are characterized by large hearths, large quantities of bone debris and tools, along with small shelters. This type of feature represents an area of processing activities, food consumption, and socializing adjacent to the butchering area. Women are documented as accompanying men to these areas where they assist in butchering and processing activities. Binford notes that elements are often tested for marrow quality at this feature. Elements having good quality marrow are selected for later transportation back to the residential site (1978:175)

Stevenson's descriptions of this hunting stand reflect the characteristics of both the observation/shooting points and the conversational/consumption areas described by Binford. The abundance of tool making debris and the location of the feature suggest that it was an observation/shooting point rather than a conversation/consumption area. Large quantities of marrow bones, primarily those with fairly low meat utility values, may reflect the transportation of "snack" foods into the feature for immediate consumption by hunters over a period of many years. If marrow from bones was being consumed, but the elements were not being further reduced for grease processing, it is reasonable that they would appear in the faunal assemblage. Based upon this assumption, it is likely that women were not processing marrow or grease in large quantities at the hunting blind feature, even though inverse relationships demonstrated by the plots would suggest the contrary. With regards to the function of the hunting stand as opposed to the function of the domestic/residential areas previously discussed, absences and under representations of high utility elements could be explained by the caching of the butchered carcasses near by or by their transportation away from the hunting stand to the residential area for processing and consumption.

Stevenson estimates that Feature 12 represents a spring occupation based upon the presence of fetal or very immature caribou. Further examination of the faunal assemblage revealed no evidence to the contrary. In addition, scapulae represent 60% of the maximum MAU for the Feature 12 assemblage. A high proportion of scapulae, elements high in meat utility but low in marrow and grease utility, indicates that elements of high meat utility were introduced into Feature 12 despite weak %MAU/Meat Utility correlations suggesting the opposite. This conclusion is supported by Binford's observations. Binford notes that during spring hunting periods, meat usually tends to be limited. Hunters will generally eat the lowest quality meat portions in the hunting camps or stands, reserving the choicest elements with the highest amount of meat for transportation back to the residential camp. During the spring, elements of poorest quality such as the necks are fed to dogs, while the hunters themselves eat front quarters, heads, and elements of high marrow utility (which tends to be poor during the spring) but very low meat value such as the distal tibia (1978:171). Thus, the presence of fairly high meat utility elements such as scapulae at the hunting stand offers another clue to a spring utilization.

This feature provides an interesting dilemma with regards to previous conclusions about the utility indices. Very similar conclusions to those for the residential sites and features may be drawn for Feature 12. These conclusions may prove erroneous given that it is a different type of site. First, a strong %MNE/Whole Carcass correlation indicates that whole carcasses were in fact introduced into the feature. While this is entirely possible, it is also likely that numerous partial carcasses were introduced into the site, and that this feature may represent a palimpsest of seasonal utilizations, resulting in a large faunal assemblage, appearing as if whole carcasses were introduced into the area. Comparisons for the %MAU versus the Standard Bulk Density Plot revealed a strong correlation indicating that natural attrition was acting upon the formation of this assemblage. Yet, human activity must also be considered as a factor, as the presence of lithic debris and tool making indicate a substantial human presence. Weak assemblage correlations with meat, marrow, and grease utility indices indicate that elements were not being selected for any of these qualities.

Previously, inverse relationships created by weak correlations and poor fits of the plots with expected models were interpreted as providing indirect evidence for the actual performance of those activities, and for the importance of women's activities upon the generation of the faunal assemblage. Architectural and artifactual evidence, however, suggest strongly that Feature 12 represents a hunting stand rather than a domestic/residential area. Large scale marrow and grease processing activities would not be expected to occur (nor are they documented as occurring) at these sites. Typically, hunting stands represent areas where men scan for animal herds, hunt, and repair or manufacture tools, all without a large presence of women. Therefore it seems unreasonable to assume that the inverse relationships previously relied upon to indicate the influence of women upon the faunal assemblages should apply in a situation where women generally do not exhibit a strong presence. In this case, it seems reasonable to accept the utility indices at face value.

Evidence for gender-related activities at Feature 12 strongly support a definite male presence. Lithic debris along with tools in various stages of construction/repair indicate that industrial activities were occurring as well as hunting. No apparent evidence exists for a significant female presence at the hunting stand. A high proportion of scapulae, combined with weak %MAU/Meat Utility correlations may provide a clue towards a spring utilization of the feature. Fetal and subadult caribou remains strongly indicate spring kills. Large quantities of low meat utility and high marrow utility bones possibly indicate the transportation of elements to the stand for snacking, or the selection of the poorest quality elements for consumption at the hunting stand prior to returning the meat to the residential camp, another clue for spring utilization. Feature 12 probably represents a palimpsest of spring utilizations whereby large quantities of caribou remains accumulated over a long period of time, with mostly, but not only the choicest elements being sent on to residential areas for processing of meat, marrow and grease.

Figure 5.46. Hornaday River No. 15, Feature 12 Hunting Blind: %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.3896, p=.025

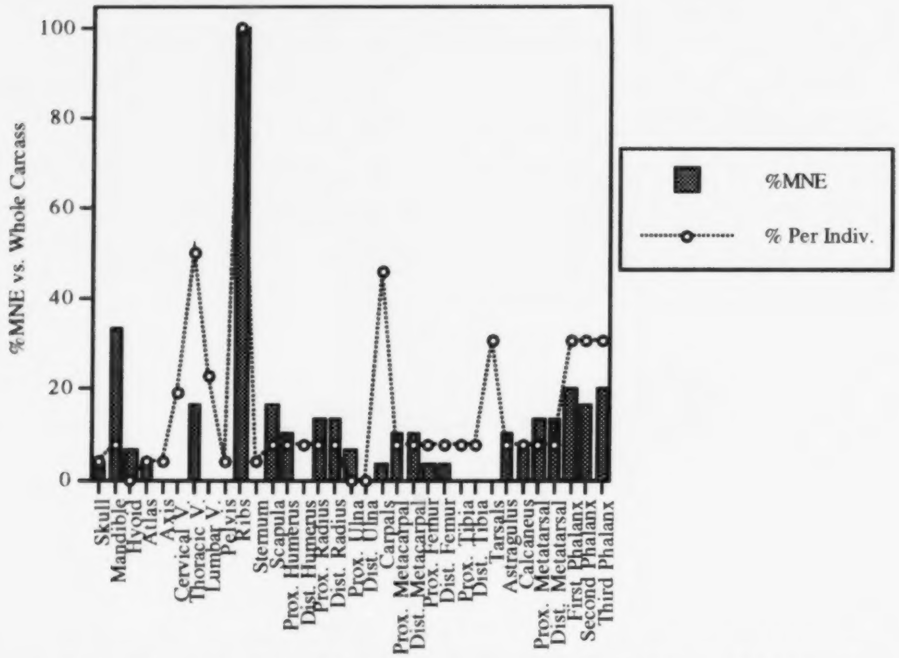


Figure 5.47. Hornaday River No. 15, Feature 12 Hunting Blind - %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.4092, p=.018

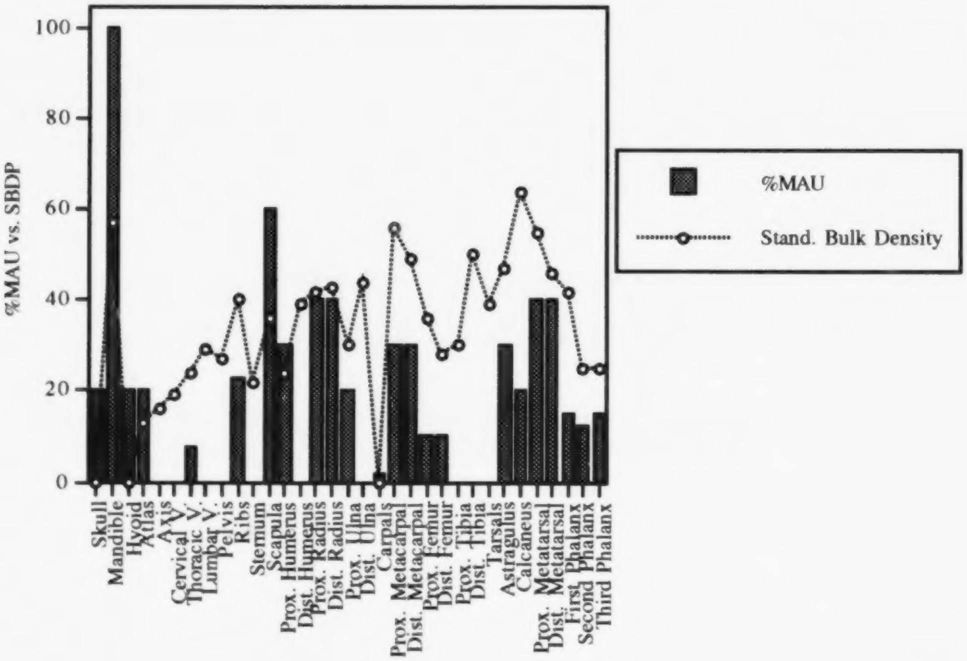


Figure 5.48. Hornaday River No. 15, Feature 12 Hunting Blind - %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.1932, p=.281

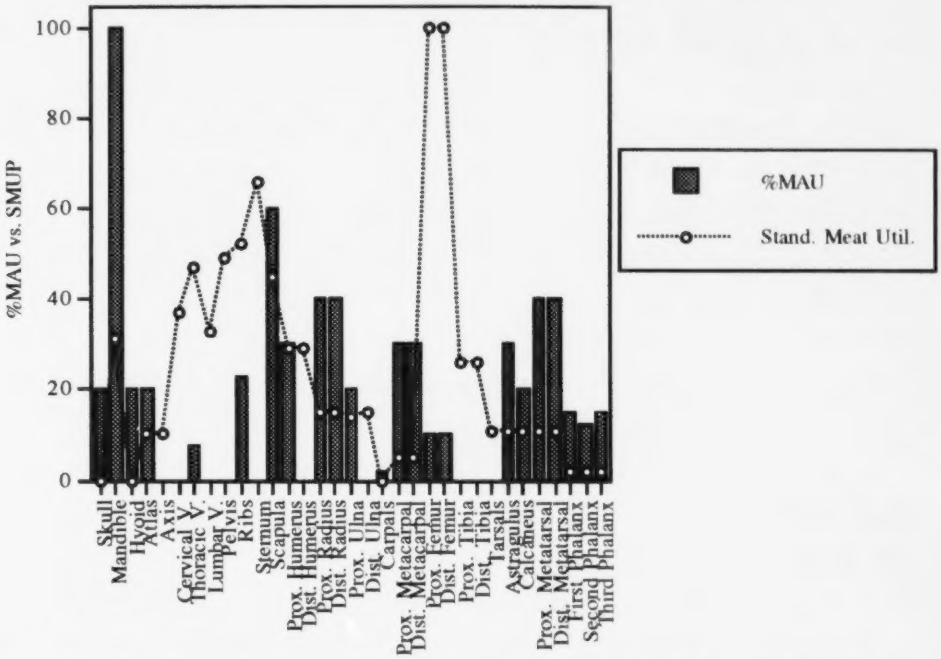


Figure 5.49. Hornaday River No. 15, Feature 12 Hunting Blind - %MAU / Standard Marrow Utility Plot by Skeletal ElementSpearman's r=.3070, p=.082

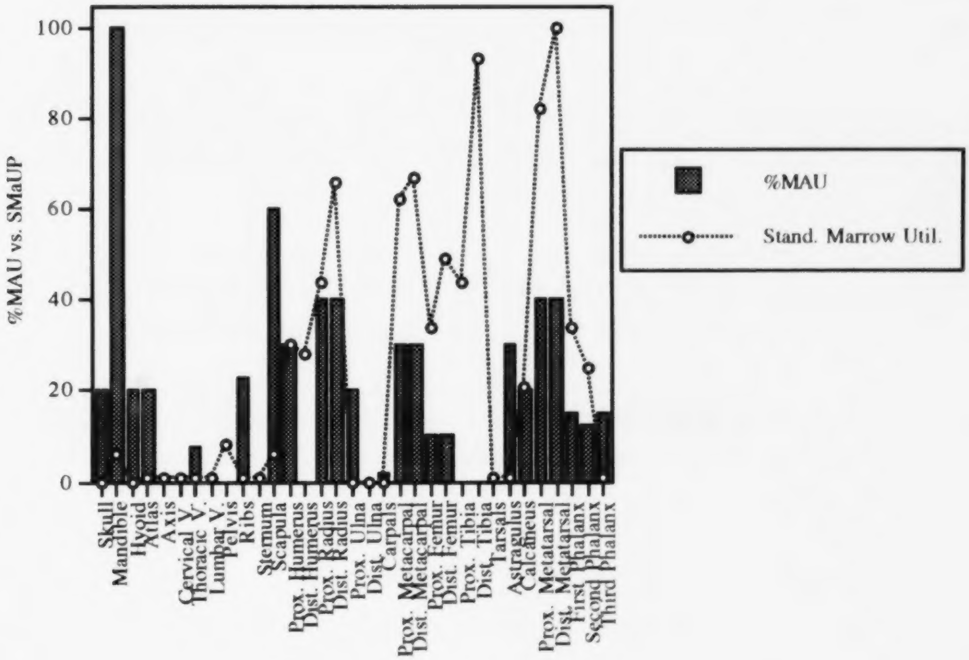
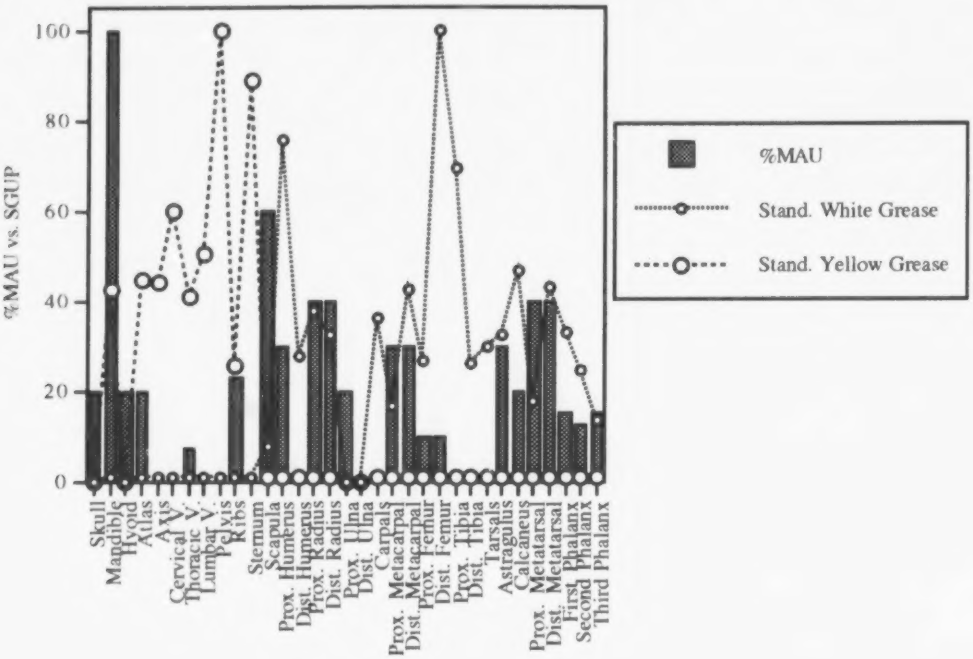


Figure 5.50. Hornaday River No. 15, Feature 12 Hunting Blind - %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=.1868, p=.298 Yellow Grease: Spearman's r=-.2542, p=.153



Amundsen Gulf No. 17

Statistical analysis was conducted upon this site with limited success using element counts in Table 4.21. In trying to determine Whole Carcass introduction a moderately strong correlation was discovered for the %MNE comparison against the Whole Carcass Plot illustrated in Figure 5.51 (Spearman's r=.3260, p=.064). The plot somewhat resembles but does not closely fit the expected plot. Whole and partial carcasses were likely introduced into this site.

Comparisons of the %MAU versus the Standard Bulk Density shown in Figure 5.52 demonstrates a weak correlation (Spearman's r=.2078, p=.246). High bulk density elements exhibit under representation, while low density elements remain over represented. This type of patterning appears improbable if generated strictly by natural forces. Human activity is credited with the assemblage formation.

To determine element selection based upon meat utility, %MAUs were plotted against the Standard Meat Utility Index in Figure 5.53 yielding a very weak correlation (Spearman's r= -.1146, p=.525). Elements possessing high meat utility exhibit under representation. Conversely, low and moderate meat utility elements are over represented. The plot exhibits no real fit with the expected model, indicating that elements were not imported for their meat utility. Given the whole vs. partial carcass interpretation above, it is suggested that kills may have been made both nearby and at a distance, that some high meat utility elements were probably introduced into the site, and removed from the assemblage through successive stages of carcass processing.

To test for element introduction based upon marrow utility, %MAUs were plotted versus the Standard Marrow Utility Index in Figure 5.54, indicating a quite strong correlation (Spearman's r=.4215, p=.015). The plot resembles the expected model for an assemblage in which elements are chosen for their marrow content. However, elements of highest marrow utility remain under represented, and elements of low and moderate marrow utility exhibit over representation. The relationship demonstrated by this plot suggests that elements were chosen for their marrow content. If the inverse relationship of this plot is postulated in the same manner as in previous plots, the relationship then suggests that marrow processing did not occur, as some high marrow utility elements are still present. But, since most of the marrow bones present in the assemblage are broken to varying degrees, it is likely that marrow processing did occur, but that further grease processing did not fully reduce the elements to an undiagnostic state. If the elements were not later selected for grease production, they would remain in the assemblage.

%MAUs were plotted versus the Standard Grease Utility Indices for both white and yellow grease illustrated in Figure 5.55. A strong negative correlation resulted from the white grease plot (Spearman's r=.2026, p=-.0473). High white grease utility elements appear underrepresented, while low white grease elements exhibit marked over representation. The plot demonstrates no fit with the expected model, indicating that elements probably were not brought in for white grease utility. A weak correlation is also indicated by the %MAU/Yellow grease correlation (Spearman's r=-.0473, p=.794). High yellow grease utility elements appear under represented. Low and moderate yellow grease utility elements remain over represented. The yellow grease plot exhibits no real fit with the expected model, indicating again, that elements probably were not introduced for their grease utility. However, plots for both white and yellow grease indicate highly inverse relationships, which may be interpreted as selection of elements for grease processing activities.

Stevenson estimates a summer and fall occupation of Amundsen Gulf No. 17. Further research into the faunal assemblage yielded no contrary evidence. No medullary bone was identified in the long bones of migratory waterfowl recovered from the site. While this absence provides no concrete evidence, and may be explicable by the killing of male birds, it still provides a fairly strong clue to a late summer or fall kill. The caribou assemblage noticeably lacks both fetal as well as subadult caribou, also indicating a possible fall kill.

Scapulae within the assemblage represent 0% of the maximum MAU for the site. Combined with the weak %MAU/Meat Utility correlation, it would appear that high meat utility elements were not being introduced into the site in any quantity. Considering the quality of marrow from fall killed animals, it is unlikely that too many high meat utility elements (also high in marrow utility) were abandoned at the kill site.

The Amundsen Gulf No. 17 site may be summarized by a few general conclusions. %MNE/Whole Carcass Plots yielded a moderately strong correlation, suggesting the introduction of whole and partial carcasses into the site. Weak correlations between %MAUs and Standard Bulk Density plots indicate that assemblage formation was affected by forces other than natural attrition. Human activity is credited with the generation of the faunal assemblage. A weak correlation between %MAUs and the Meat Utility Index, combined with a weak fit of the plot with the expected model suggests that high meat utility elements were not introduced into the site. Observation of the inverse relationship created by this plot, within the context of a residential site, indicates that the high meat utility elements could have been introduced into the site. Their absence may be accounted for by their removal during marrow and grease processing activities. Scapulae represent 0% of the maximum MAU for the site. Their absence may be accounted for by the destruction of the bones during marrow and grease processing, or perhaps they were never introduced into the site at all.

The marrow plot revealed a fairly strong correlation, reflecting the introduction of elements based on their marrow contents. To maintain consistency with previous observations, the inverse relationship of this plot, given the presence of some high marrow utility elements would suggest that marrow processing was not a significant factor. However, if the site represents a fall occupation, it is unlikely that bones would not have been processed for marrow as it is of highest quality during this season. Given that some of the high marrow bones present were broken, it would appear that marrow extraction did occur, but not all of these bones were later smashed for grease extraction. Weak correlations demonstrated by white and yellow grease utility indices suggest that elements were not introduced for grease processing. However, inverse correlations would indicate that white and yellow grease processing activities did occur, and when combined with the above marrow bone analysis suggest that grease processing was not always exhaustive. Inverse relationships for meat and grease (both white and yellow) provide indirect evidence for gender-related activities, by indicating their occurrence.

Several possibilities exist to explain the lack of evidence for marrow production at the Amundsen Gulf No. 17 site. Inverse relationships demonstrated by %MAU/Meat Utility Plots indicate that some high meat utility elements which also contain high marrow utility were introduced into the site. Theoretically, in a fall assemblage, marrow bones should have been processed. The inverse of the %MAU/Marrow Utility Plot suggest that marrow processing did not occur. Inverse relationships of %MAUs versus Grease Utility Indices do indicate grease production. So, it is possible that in fact marrow elements were introduced into the site. The fragmented state of many of the elements suggest breakage for access to marrow. But, the presence of many marrow elements may indicate that they were not selected for grease processing. If animals were in a very poor nutritional state (not likely), or if people did not need more grease, elements may not have been processed for grease. Natural attrition may have acted to remove some elements from the assemblage, or perhaps elements were transported away from the site for disposal.

The assemblage probably reflects the influence of women's decisions concerning carcass processing, and their active contribution to the generation of the record through their carcass processing activities. Based upon the low percentages of scapulae in the faunal assemblage one is likely to suggest a fall occupation, supported by the lack of very immature caribou remains.

This site's faunal assemblage suggests that it was a fall "staging" site, where people came to prepare for a winter on the sea-ice. Most of the caribou remains were probably brought in from caches further inland, although chance fresh kills may have augmented the stored food. Meat, Marrow and grease processing was minimal, first, because this would have taken place earlier and was only supplemented at this site, and second, because the women were preoccupied with other preparations, especially the construction and repair of winter, caribou-skin clothing. The men, likewise, would have been mostly concerned with other winter preparations.

Figure 5.51. Amundsen Gulf No. 17 %MNE / Whole Carcass Plot by Skeletal Element Spearman's r=.3260, p=.064

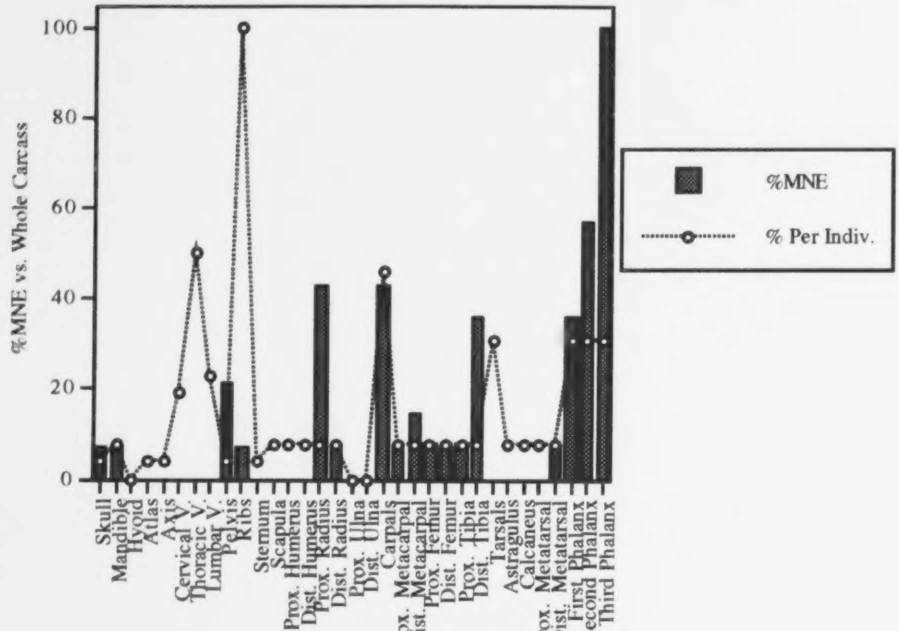


Figure 5.52. Amundsen Gulf No. 17 %MAU / Standard Bulk Density Plot by Skeletal Element Spearman's r=.2078, p=.246

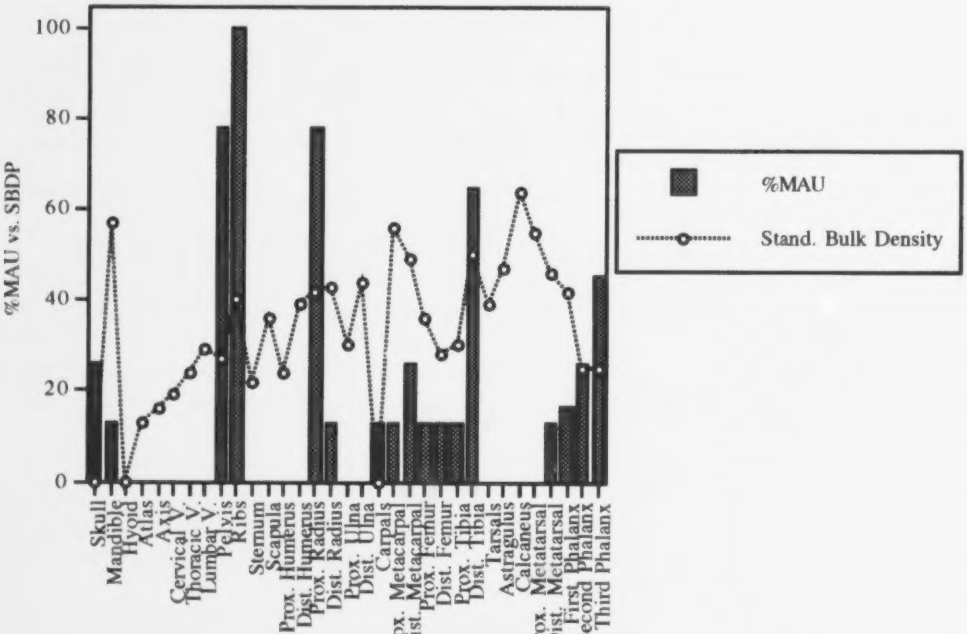


Figure 5.53. Amundsen Gulf No. 17, %MAU / Standard Meat Utility Plot by Skeletal Element Spearman's r=-.1146, p=.525

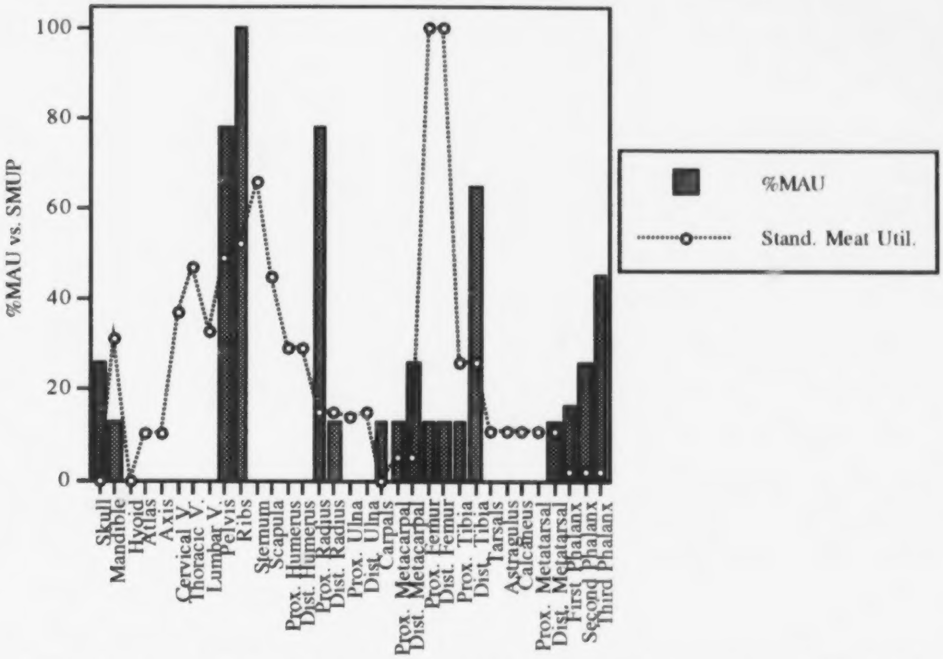


Figure 5.54. Amundsen Gulf No. 17, %MAU / Standard Marrow Utility Plot by Skeletal Element Spearman's r=.4215, p=.015

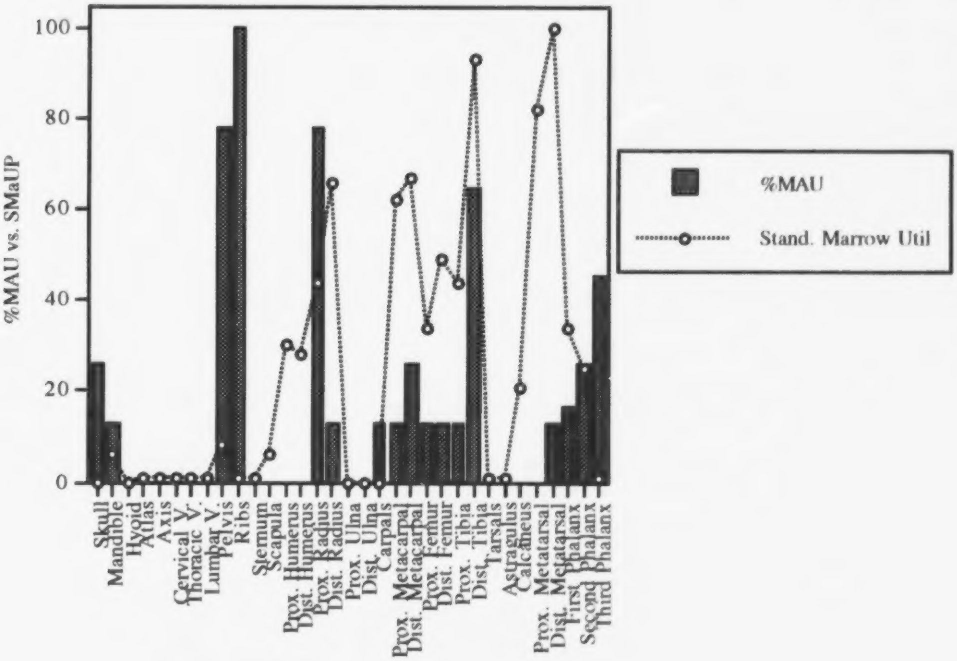
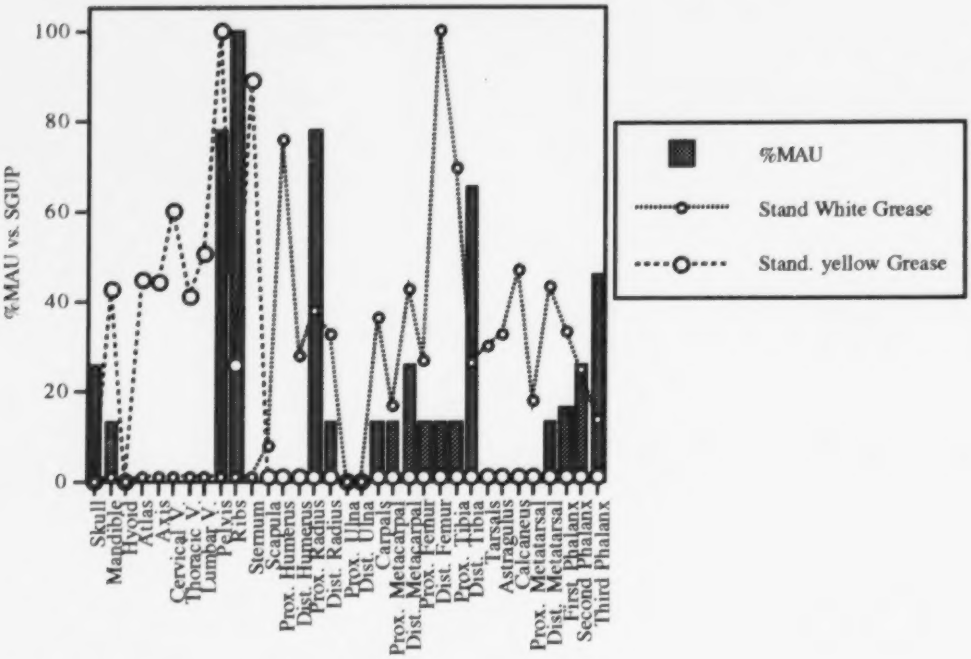


Figure 5.55. Amundsen Gulf No. 17, %MAU / Standard Grease Utility Plot by Skeletal Element White Grease: Spearman's r=.2026, p=-.0473 Yellow Grease: Spearman's r=-.0473, p=.794



Tent Rings: Bluenose Lake No. 6 (Feature 15) and Hornaday River No. 15 (Feature 1)

Comparisons between plots for the two tent rings (Figures 5.16 to 5.20 and Figures 5.41 to 5.45, respectively), show no real patterns between either the %MNE values versus proportions of elements in whole skeletons, or %MAU scores versus bulk densities. In the first case (Figures 5.16 and 5.41), all appendicular elements for Feature 15 are consistently under-represented, while appendicular elements which are represented for Feature 1 are consistently over-represented. However, one similarity exists between the two plots. Axial elements represented by skull, mandible, pelvis, and ribs all occur with expected or higher than expected frequencies.

Observations of %MAU versus bulk density plots (Figures 5.17 and 5.42) show almost identical representation for moderately dense axial elements of skull, mandible, and pelvis, and for denser appendicular elements of calcaneii and distal metatarsals. Very dense bones such as vertebrae and foot bones are consistently under-represented in both features, indicating that processes other than natural attrition are active in assemblage patterning.

Comparisons of %MAU versus standard meat utility plots for the two tent rings (Figures 5.18 and 5.43), show two similarities. Neither have strong correlations between %MAU and the meat utility index (r=-.1487, p=.409, and r=.1041, p=.564 respectively). Both exhibit under-representation of axial elements, excepting the skull and mandible. Elements possessing the highest meat utility values are drastically under-represented.

Comparisons of marrow utility index plots (Figures 5.19 and 5.44) show very similar patterning in the assemblage. Elements of low marrow utility value are sharply over-represented. Elements of highest marrow utility value are markedly under-represented, or absent altogether.

Comparisons of %MAU scores versus the standard grease utility index for the tent rings, (Figures 5.20 and 5.45) exhibit certain similarities. Elements of moderate white grease utility occur with approximately equal proportions in each feature. High white grease utility and high yellow grease utility elements are both strongly under-represented. However, as both features have very weak correlations of %MAU versus the white grease utility index and of %MAU versus the yellow grease utility index, it is uncertain whether or not this type of assemblage patterning is to be expected in tent ring features.

Amundsen Gulf No. 10

Stevenson provides no estimates for seasonality of site occupation at the Amundsen Gulf No. 10 site. It is suggested in this thesis that owing to the scarcity of faunal remains, the site was probably only very briefly occupied, perhaps during the spring. The site likely represents an occupation just after returning from a winter on the ice, as supported by a number of seal bones. No tests of utility indices were performed owing to the representation of caribou at this site by only a single rib. This site offers the "spring" complement of the Amundsen Gulf No. 17 site's "fall" assemblage.

Discussion

The preceding discussions provided the reader with a somewhat overwhelming amount of positive and negative evidence. Table 5.1 presents, in matrix form, the characteristics discussed in the preceding summaries for each site, feature, and occupational designation. The matrix illustrates the lack of significant correlations resulting from the statistical analysis. With so very little positive evidence, reasons for considering inverse relationships become clearer.

To maintain continuity with the conclusions previously drawn by Stevenson regarding possible multiple occupations of these sites (Stevenson 1992), faunal assemblages from the Bluenose Lake No. 6 and the Hornaday River No. 15 sites were subdivided according to the features included within each occupational component. Methods of element counting and the economic utility indices developed for caribou were then applied to each sub-assemblage. Comparisons generally indicated no significant correlations between the %MNE versus the whole carcass plots, or between the %MAUs versus the bulk density and utility indices for meat, marrow, white, and yellow grease.

Several possible explanations exist for the lack of significant correlations, and the subsequent poor fit with Binford's models, resulting from this analysis. The subassemblages may be too small to prove useful through statistical manipulation; however, two of the Hornaday River subassemblages and one of the Bluenose Lake subassemblages contained over 100 bones each.

Table 5.1. Correlations Exhibited by Sites, Features, and Occupations

Site	%MNE/ WC	%MAU/ BD	%MAU/ Meat	%MAU/ Marrow	%MAU/ W Grease	%MAU/ Y Grease	Season
BR 3	-	-	-	-	-	-	Spring
BN 6	+	-	-	-	-	-	Spring
BN6 F1 1st comp.	-	-	-	-	-	-	Spring
BN6 F15 2nd comp.	-	-	-	-	-	-	Spring
BN6 3rd comp.	-	-	-	-	-	-	Spring
HR15	+	-	-	-	-	-	Spring/ Fall
HR15 1st comp.	-	-	-	-	-	-	Spring
HR15 F4 2nd comp.	-	-	-	-	-	-	Fall
HR15 F1 tent	-	+	-	-	-	-	Spring
HR15 F12 blind	+	+	-	-	-	-	Spring
AG 17	+	-	-	+	-	-	Fall

Occupational divisions suggested by Stevenson may be inaccurate. He based conclusions of cultural affiliation primarily upon architectural remains, lacking artifactual remains at several of the sites. At the Bluenose Lake site, artifacts were recovered from Features 2, 3, and 15. Stevenson notes (1992:130) that "until radiocarbon analyses are conducted on faunal remains from each component, this sequence must remain speculative." Conclusions for the Hornaday River site are obtained with a similar reliance upon architectural features, although the Hornaday River site produced a greater number of diagnostic artifacts.

Low correlations between %MAU and utility indices may simply reflect the temporary nature of the sites studied. The design of the utility indices was based upon observations of Nunamiut living in Northern Alaska around Anaktuvuk Pass (Binford, 1978). The Nunamiut follow a general pattern of movement from one seasonal site to another. Archaeological assemblages have the opportunity to build during the months that these sites are occupied, as well as over years of periodic use, thus becoming palimpsests of temporary occupations. The sites examined in this thesis possibly result from much briefer occupations. By the very nature of the Arctic, groups of peoples may return to numerous sites while moving across the landscape, but there are also sites which are inhabited for only very short periods of time. These sites may represent single occupations, and as a result, the archaeological assemblages (including faunal remains) may be very sparse.

Low correlations between %MAU and utility indices may indicate ravaged sites, or incomplete assemblages. Faunal elements overall exhibit very little if any carnivore damage; but it is possible that elements were removed from the sites and given to dogs, who are known to have been tethered in special areas or dog yards (Binford 1978, Jenness 1991). Low correlations between some of the %MNE and Whole Carcass plots (such as Brock River No. 3) probably indicate that few whole carcasses were being introduced into the sites. Instead, carcasses were probably initially butchered away from the sites and selected portions of the animals were deposited at the sites.

Low correlations between %MAU and utility indices may indicate that all three activities-meat, marrow, and grease processing-were being undertaken with equal preference. The most common pattern within all of the assemblages is the marked under-representation of elements possessing the highest combined utility values of meat, marrow, and white or yellow grease. At first glance one might conclude that these elements were not being introduced to the sites, as there is a lack of the proper skeletal elements. However, Binford (1976:348) notes that the remains left for archaeologists are often the negative or inverse of the activities that were actually occurring within the site. In effect, a plot that correlates well with the utility indices shows us that the assemblage was shaped by primary, male decisions: what was brought into a site depended on factors such as distance and season of kill. Non-correlations may reflect secondary, female decisions and actions upon the initial assemblages. Therefore, it is suggested here that the elements having the highest marrow and grease utility values were actually being selected for processing. Bone destruction during processing, for marrow and especially for grease, could possibly reduce the elements to a degree unrecognizable for diagnostic purposes by most archaeologists. As bones may have high utility values for meat and marrow or grease, even elements with high meat utility could be further reduced and then lost from the archaeological record. It will be necessary, therefore to examine all analyses for each site together to form the best possible conclusions.

Previous sections of this thesis presented several methods of quantifying faunal assemblages in an effort to discern the types of activities occurring at the sites. . Each summary includes the results of all tests, with general conclusions regarding the implications of the results.

Comparisons of the %MNE with the Whole Carcass Plots yielded weak correlations in seven of eleven instances, indicating that whole carcasses probably were not introduced into the sites, features or occupational designations. Some of the weak correlations are of borderline significance, in which case it is possible that both whole and partial carcasses were introduced into the areas. In the remaining four cases, (one of which is the hunting blind at Hornaday River) strong correlations indicated the introduction of whole carcasses. These correlations, combined with other evidence from the sites, including artifactual, faunal and architectural, help to provide some insight into the factors influencing the introduction of carcasses into sites and features. For instance, if a kill occurred in the spring, marrow and meat quality might influence the abandonment at the kill site of selected skeletal elements, while others were transported to the residential sites. It then becomes necessary to observe the instances in which significant correlations occur in order to draw conclusions about whole vs. partial carcass introduction.

In determining the survivorship of bones within the assemblage, comparisons of %MAU with Standard Bulk Density Plots yielded weak correlations in nine of eleven tests. These tests suggest that factors other than those of natural attrition played a significant role in the formation of the faunal assemblages. In almost all instances, elements of high bulk density appear underrepresented, while low bulk density elements exhibit over representation. Such patterning in the faunal assemblage is suggested to be the result of human activities. The remaining two comparisons, the hunting blind at Hornaday River and the tent ring at Hornaday River, yielded significant correlations, suggesting that natural attrition was at least partially responsible for assemblage formation. As all of these assemblages occur within human occupation and activity areas, it is likely that human activity played a large role in their formation. In instances where strong correlations would indicate formation from primarily natural attritional processes, it is important to consider why certain assemblages remain somewhat intact. Interestingly, both of the strong %MAU/Bulk Density correlations come from activity areas determined to be spring utilizations. Possibly, elements were not destroyed by humans to a great extent during this period owing to poor quality marrow and grease content.

Weak correlations were observed in all eleven comparisons of %MAU with the Standard Meat Utility Index. Ideally, if an assemblage was formed solely through meat processing activities, the utility plots would reflect significant correlations. Essentially, assemblages will resemble meat plots only in instances where elements possessing high and medium meat values are introduced into a site, the bones are stripped of meat, and permanently discarded. Spring kills are expected to match this profile closely. During the spring, caribou are generally in a poor nutritional state. Marrow is of poor quality and not processed in great quantities. Instead, elements are brought in for their meat value, and low meat/high marrow bones are not introduced into the site, or are later discarded.

Since most elements that possess high to medium meat utility values (except for scapulae) also contain high to medium marrow and grease utility values, a large percentage of these bones will be broken for marrow extraction and later smashed for grease processing except during the spring (unless marrow and grease are desperately needed). As a result, assemblages probably will not reflect the selection of elements for meat utility. It is then of no great surprise that none of the assemblages resemble the expected models for meat utility. However it is interesting to note that even areas designated as spring occupations display no significant %MAU/Meat Utility correlations.

Given the above, it is possible to formulate three main hypotheses to explain the observed correlations in the sites, features and occupations. First it is possible that high and medium meat value items were simply not introduced into a site. Second, elements possessing high and medium meat values could have been removed from the site or processing area for consumption elsewhere. Third, high and medium meat utility elements were introduced into the sites, but through successive stages of processing for marrow and grease, the bones were reduced to such a degree as to be unidentifiable in the field, and elements perceived as undiagnostic were not collected from these sites. Given the results from %MNE/Whole Carcass and %MAU/Bulk Density analyses suggesting whole carcass introduction into the sites and human behavior influencing assemblage composition, it is unlikely that Hypothesis 1 is valid for the Bluenose Lake No. 6 site in general, the Hornaday River No. 15 site in general, and the Amundsen Gulf No. 17 site. However, when applied to Features 15 at Bluenose Lake, Feature 1 at Hornaday River, and the specific components of these sites outlined by Stevenson, Hypothesis 1 appears likely.

%MAU/Marrow utility analyses indicate poor fits with the expected plots in ten of eleven cases. However, if one considers the successive stages of bone reduction involved in processing for meat, marrow and grease, the weak correlations do not come as much of a surprise. In effect, the marrow utility plots likely reflect the inverse relationship to that indicated by the comparisons. The three hypotheses suggested for the %MAU/Meat utility index are proposed for marrow. First, high and medium marrow utility elements were not introduced into the sites. Second, high and medium marrow utility elements were removed from the site for consumption elsewhere. Third, high and medium marrow utility elements were introduced into the site, but were further reduced by additional processing for grease.

Considering that the %MNE/Whole Carcass and %MAU/Bulk Density analyses indicate whole carcass introduction into several sites (see above), and that human behavior was an important assemblage formation process, Hypothesis 1 seems unlikely for all of the sites except Amundsen Gulf No. 17. The Amundsen Gulf site provides an interesting case. If the results of the %MAU/Marrow plot are interpreted as being the inverse of the actual comparison, then this site represents the only site where marrow bones were not processed. The question then remains, why? This question is addressed more closely in the individual discussion on Amundsen Gulf 17.

%MAU/White and Yellow grease index plots indicate no fits for any site, feature or component suggested by Stevenson. Weak correlations were observed in all white and all yellow grease tests (22 total). A very strong under-representation of elements possessing the highest white grease utility values is common in all cases. Visible over-representation of elements having moderate to low white grease utility values also frequently occurs. Based upon the lack of significant correlations for either white or yellow grease, a highly inverse relationship may be hypothesized between the actual %MAUs and the "ideal" white and yellow grease utility plots. The inverse relationships indicated in the utility plots support the third of the proposed hypotheses, that high and medium utility value elements were brought into the sites, but later reduced through additional processing for marrow and grease. As previously argued, whole, or whole and partial carcasses were likely introduced into the sites of Bluenose Lake No. 6, Hornaday River No. 15, Feature 12 at the Hornaday River site, the three components within the Hornaday River and the two components within the Bluenose Lake site and Amundsen Gulf No. 17. Elements remaining represent waste after the high utility elements were removed, marrow was extracted by breaking the bones, and grease was extracted through crushing and boiling of the fragmented bones. The elements were reduced to the degree that they were diagnostically unrecognizable by archaeologists, or were completely destroyed, thus removing them from the archaeological record.

Evidence of gender-related activities may be interpreted from this analysis in the following manner: carcass processing activities within the residential camps are largely the responsibility of women (see Chapter. 2). Elements' presence within an assemblage are the results of two sets of decision-making: primary, or male, and secondary, or female. Primary, or male, decision-making determines which skeletal elements are introduced into the site, since the hunter is generally male. Secondary, or female, decision making determines which bones are removed from a site through removal to another location, or by subsequent stages of reduction for marrow and grease production. Selection of elements from those introduced into sites, whether in partial or whole carcasses, for processing is documented as being the women's responsibility (Binford, 1978). Thus, by removing elements from the assemblage, women are playing a significantly larger role in assemblage formation than previously considered.

It is possible to interpret indirect evidence for gender-related activities from the results of this analysis based upon the negative relationships observed in the utility plots. Plots for meat, marrow, and grease yielded weak correlations and under representations of elements possessing high utility values. By observing the inverse relationships of the meat, marrow, and grease utility plots, it is possible to surmise that elements were actually selected for these specific qualities, processed, and eventually removed from the assemblage by women.

Scapulae Occurrence

The occurrence of scapulae (high in meat value, but low in marrow and grease values), indicate the introduction of high meat utility elements into a site, and, as suggested by Hickey (1993, personal communication), may provide both evidence to test the hypotheses and a clue to sorting out seasonality. By observing the occurrences of scapulae in the faunal assemblages, and their proportions in the overall assemblage we get the results illustrated in Table 5.2. Proportions of scapulae within the faunal assemblages are suggested as clues in attempting to determine the seasonality of site activities using the following logic. In Hypothesis One, high proportions of scapulae to other elements would be expected in fall-killed assemblages. Owing to the high quality of marrow during the fall, most elements of high and moderate marrow and grease utility (some of which possess high meat utility) would be destroyed during successive stages of marrow and grease processing. The resulting assemblages would contain a large percentage of scapulae (elements with high meat but low marrow and grease utility) and other low marrow/grease utility elements generally considered as waste.

Table 5.2. Observations of Scapulae Occurrences in Sites

Site	NISP	MNE	Scap. Mau	Max MAU / Site	Scap. %MAU	Season
Brock River 3	1	1	0.5	1	50	Spring
Bluenose 6	5	3	1.5	2.5	60	Spring/Fall
Bluenose 6 F-1, Comp. 1	1	1	0.5	0.77	64.94	Spring
Bluenose 6 F-15, Comp. 2, tent	1	1	0.5	3	16.67	Spring/Fall
Bluenose 6 Comp. 3	2	2	1	2.5	40	Spring/Fall
Hornaday 15	12	7	3.5	7.5	46.67	Spring/Fall
Hornaday 15 Comp. 1	9	9	4.5	4.5	100	Spring
Hornaday 15 F-4, Comp. 2	2	2	1	3	33.33	Fall
Hornaday 15 F-1, tent	3	3	1.5	5	50	Spring
Hornaday 15 F-12, blind	6	6	3	3	60	Spring
Amundsen Gulf 17	0	0	0	3	0	Fall

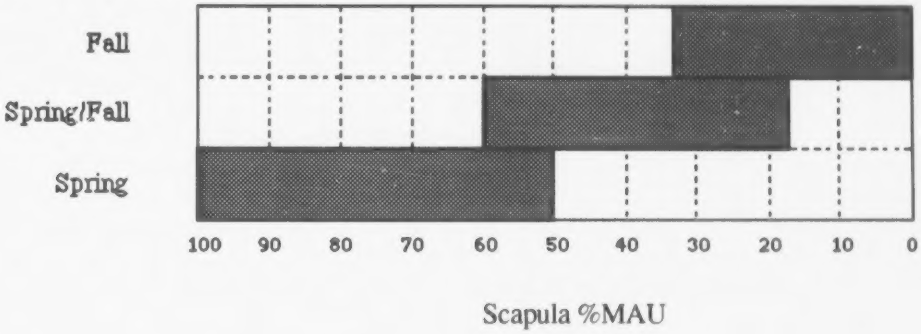
Conversely, spring-killed assemblages would illustrate lower proportions of scapulae to other skeletal elements. Poor marrow quality in spring-killed animals would be expected to minimize destruction of elements for large-scale marrow and grease processing. Lower proportions of scapulae to other elements should result, as bones are not being removed from the assemblages through marrow and grease production.

Hypothesis Two provides the opposing scenario, with a higher presence of scapulae in spring. In this case, fall assemblages reflect either scapulae processing for marow and grease or removal from the site along with dried meat. In spring, other elements are processed for marrow and grease, but the scapulae are not.

Examinations of proportions of scapulae within the faunal assemblages support the second hypothesis. Seasonality for the sites, features, and occupations was determined primarily from faunal evidence: presence/absence of immature caribou, species diversity, and presence/absence of medullary bone in migratory waterfowl (when available). Proportions of scapulae within assemblages provide additional support for seasonality estimates by illustrating the emphasis placed upon introduction of high meat utility elements (and perhaps whole carcasses) into sites.

Three patterns were observed (see Figure 5.56). First, previously estimated spring occupations demonstrated scapulae representing between 100% and 50% of the maximum MAU for the assemblage, (occurring in 5 of 5 cases). Second, the two late summer-fall assemblages (Hornaday River No. 15 2nd component, and Amundsen Gulf 17) both had very low or zero percentages. Four assemblages, those of Bluenose Lake No. 6 overall, Bluenose Lake No. 6 2nd and 3rd components, and Hornaday River No. 15 overall fit neither pattern. In these assemblages scapulae represent an intermediate position between 17% and 60% of the Maximum MAU. Multiseasonal occupations are suggested. Tentatively, Hypothesis 2 of the scapulae argument therefore seems supported.

Figure 5.56 Illustration of Scapulae Percentage Patterning (Constructed from Table 5.2)



Summary and Conclusions

This thesis has explored faunal assemblages from five archaeological sites in the Bluenose Lake region of the Northwest Territories, Canada. Various approaches to interpreting the data, both processual and post-processual, were presented, all with variable degrees of interpretive clarity.

The first chapter provided a discussion of the history and application of zooarchaeological techniques. Within this section, it is noted that as zooarchaeological problems evolve and become more complex, it is necessary for the methodologies to evolve in order to keep pace with researchers' needs. Processual and Post-Processual archaeology and their different approaches are discussed in this section as a means of providing a foundation for this project. A concern is expressed regarding the feasibility of conducting this type of research on such small assemblages.

The second chapter reviewed past and present research in one particular aspect of post-processualist archaeology, that of gender. It has been suggested that archaeological research conducted from a gender perspective is a potentially very useful tool in archaeology, which should not be utilized **at the expense of** scientifically quantitative methods. Ideally, gender theory should be used in combination with standard scientific quantitative methods in order to obtain the most information possible.

It is argued within this thesis that gender roles are likely to play a significant part in the formation and patterning of zooarchaeological assemblages. Direct, obvious evidence of gender influence is difficult to discern. Based upon the analysis of faunal elements it is suggested that assemblages reflect two types of decision-making. First, the primary decisions are made by men, the hunters, about which elements are introduced into the sites. The secondary decisions, made by women responsible for carcass processing, determine which elements remain in the assemblage, and which elements are chosen for reduction through marrow and grease processing activities. Analysis of artifacts combined with faunal analysis also begins to provide a clearer idea of ways in which gender influences faunal assemblage patterning. For example, Feature 12, the hunting blind at the Hornaday River 15 site, contained evidence of men's activities such as manufacturing and repair of stone tools. Ground and chipped stone knives and points were recovered from this area, but no specifically women's tools were identified. The faunal assemblage differed from those in other sites and features, having large proportions of skeletal elements low in meat value and moderate to high in marrow value. Based upon ethnoarchaeological research (Binford 1978), we may conclude that men were either transporting "snacking foods" to the hunting stand for consumption while waiting for game, or eating the limb extremities at this area prior to packing the rest of the kill home. Further specific evidence of gender influencing the formation of the archaeological record is scarce, forcing a reliance upon interpreting indirect evidence suggested by inverse relationships illustrated in the meat, marrow, and grease utility plots illustrated in Chapter 4.

Chapter 3 explored previous anthropological, archaeological and zooarchaeological research within the study area from the time of European contact (mid-1700s) to the present time. Detailed discussions of archaeological investigations and theories provide the setting for the present study. Attempts by earlier scholars to determine the origin and history of the Dorset, Thule, and Copper Inuit, illustrate the difficulties faced by archeologists in the arctic working with small faunal assemblages and scattered sites.

Site descriptions and the presentation of species element counts are contained in Chapter 4. Summaries of the 1991 excavations conducted by M. Stevenson, as well as his conclusions regarding the cultural/temporal placements of the sites are given. Stevenson's estimates for seasonality of site occupations are discussed, along with alternative suggestions based upon the additional analysis of the faunal assemblages conducted during this study.

Chapter 5 provides the analyses for each site, feature, and occupation examined within this study. Conclusions are drawn regarding the use of the site, and season of occupation based upon information obtained from the faunal assemblages, proportions of scapulae occurrence within an assemblage, and statistical analysis of assemblages examining whole carcass introduction, bone survivorship, and meat, marrow and grease utilities.

Attempts at Post-Processual interpretations of gender-related activities at the sites based upon the indirect evidence provided in the meat, marrow and grease utility plots were marginally successful. Ethnoarchaeologists have recorded the marrow and grease processing activities of contemporary Inuit peoples (see Binford's study of the Nunamiut, 1978). Women are noted as having the task of processing marrow and grease on a large scale. Marrow bones are saved until there is a large quantity, and then processed all at once, generally by groups of women who are related to one another in some manner. Grease production generally occurs just prior to moving camp, and is a very labour-intensive task. One might, therefore, hypothesize that these missing bone elements were being removed from the archaeological record by women for the purposes of marrow and grease production, and then either deposited away from the site after the activities were completed, or simply dumped at the point of processing, to be labeled "unidentifiable bone fragments" when and if they were even collected by archaeologists. We may interpret gender related activities such as marrow and grease processing as occurring at the sites and features within this study to a greater or lesser degree with the exception of Feature 12, the hunting blind at Hornaday River No. 15, at Amundsen Gulf No. 17, and at Amundsen Gulf No. 10. There is no strong evidence that marrow and grease production were carried out at Amundsen Gulf No. 17, and there were simply too few caribou elements at Amundsen Gulf No. 10 to draw any conclusions. Marrow processing activities were probably conducted at the hunting blind. However, it is suggested that the activities occurred on a different scale than those of the other sites. It is suggested that the marrow processing was a result of "snacking" by men while hunting rather than as a labour intensive effort conducted by women.

As marrow and grease processing are generally regarded as being female activities, the lack of significant marrow and grease correlations, by reflecting the inverse of the actual relationships, seems to indirectly indicate that women were present and performing food processing activities at these sites, thus directly influencing the formation of the archaeological record.

Chapter 6 provides a brief cultural historical/behavioral conclusion to this project, attempting to elevate it from a detailed faunal analysis to a well-rounded interpretation of the material from the archaeological sites in this study. Suggestions regarding the lifeways and subsistence practices along with a tentatively reconstructed seasonal round for the cultural groups discussed are presented.

Suggestions for Further Research

The assemblages examined in this study provided a certain amount of difficulty when attempting to draw conclusions concerning the past lifeways of the cultures inhabiting the area. There was a lack of detailed notes regarding spatial distributions of artifacts, and their associations with the faunal materials. Most assemblages were exceedingly small, with the exception of the Bluenose Lake No. 6 and the Hornaday River No. 15 sites.

After the initial stage of analysis, a quantity of caribou bone (approximately one kg) from the Hornaday site was sent away for radiocarbon dating, making later analysis somewhat limited. As the sample sent away contained the greatest amount of caribou mandibles, it was then impractical to try and obtain an estimate of herd composition based on examinations of tooth wear and eruption. Attempts at analyzing breakage patterns in caribou long bones was rendered impractical for the same reasons. It is possible that more information could have been obtained concerning processing activities and herd composition had these two methods also been applied.

Very little caribou antler was recovered, and Stevenson's field notes appear scanty upon the subject. Based upon his recollection, there was very little antler present at any of the sites. If a close observation of antler presence/absence had been made, it may have provided a clue to seasonality. As males shed their antlers in the late fall or early winter after the rut, and gestating females retain their antlers until the birth of their calves in the spring, it may be possible to estimate seasonality based upon the types of antler recovered (Hickey, 1993, personal communication). It is suggested that future investigators might want to pay close attention to antler presence/absence, as well as the types (male or female) of antler observed.

In an attempt to detect further clues and or patterns which could assist in determining seasonality, a brief analysis of the occurrence of scapulae within each assemblage was undertaken. Proportions of scapulae for the assemblages suggested by one hypothesis (high in spring, and low in fall) were essentially obtained. Further examination of this type of patterning in faunal assemblages might be developed into a reliable model for predicting seasonality based upon the relative frequency of scapulae, which possess high meat utilities, but low marrow and grease utilities. In the absence of other high meat utility elements, scapulae presence/absence might also be used to indicate the introduction of elements into sites with a preference for meat.

Keeping gender perspectives in mind, detailed field notes regarding spatial distribution of artifacts and faunal remains may provide assistance in attempting to observe gender roles and influences in the archaeological record. A combination of Processual and Postprocessual research efforts is necessary to promote a greater understanding of such aspects of the archeological record as gender roles. Ethnoarchaeological research focusing upon the peoples of the central and western Canadian Arctic with regards to gender and carcass processing will prove essential before a quantitative analysis of this type may be conducted with any certainty.

Chapter 6. Culture Historical Framework and Interpretations

As previously discussed in this thesis, a number of different perspectives were taken in examining archaeological remains from five sites in the Northwest Territory. Zooarchaeological analysis was conducted, identifying species present, and skeletal remains to element.

Utility indices were applied to caribou remains and were quantitatively evaluated with respect to the meat, marrow, and grease utility of the elements. These indices provide information that serves as a means of determining the types of subsistence activities being performed.

Gender roles were examined in existing literature. Information gathered from the faunal remains and the negative evidence exhibited in the results of utility index analysis was applied to ethnoarchaeological models of Inuit gender roles in an attempt to reconstruct prehistoric gender roles. It now remains to piece together the individual elements examined within this thesis, and to attempt to reconstruct the seasonal round and subsistence practices of these prehistoric peoples.

Stevenson drew conclusions regarding the cultural affiliation of the sites examined based upon artifacts and architecture styles. His conclusions are accepted in this thesis, as only the zooarchaeological remains were available for analysis at the time of the research for this thesis. The individual features examined from the Hornaday and Bluenose sites are considered to be of the same affiliation as the components from which they were selected.

Stevenson denotes three cultural groups: Thule, Mackenzie and Copper Inuit. Most components in the sites examined represent Thule/Mackenzie Inuit transitions. These transitions are visible at the Brock River 3 site, Occupation 2 of the Bluenose Lake 6 site, the Hornaday River 15 site, and the Amundsen Gulf 17 site. A single component, that of Occupation 1 at the Bluenose Lake 6 site, represents the only purely Thule occupational component from any of the sites. Occupation 3 at the Bluenose Lake 6 site represents the only truly Copper Inuit component from any of the sites as well. Amundsen Gulf 10 is suspected to be Copper Inuit in origin, but may also represent a late Dorset occupation. There are no sites or components within the study which represent strictly Mackenzie Inuit presence, therefore it is not possible to speculate on the subsistence and lifestyles of those people based upon the information available from the sites. Very little may be said regarding Thule and Copper Inuit cultures individually based upon this analysis, as only a single component of each exists.

Brock River No. 3 is determined by Stevenson to be Thule/Mackenzie Inuit. He notes that artifacts are of Thule/Mackenzie Inuit styles, and that tent rings exhibit heavy construction (1992:123). The Bluenose Lake 6 site demonstrates 3 separate cultural occupations, classic late prehistoric Thule, Thule/Mackenzie Inuit transition, and an historic Copper Inuit component. These conclusions are based solely upon architecture styles, as no artifacts were recovered (1992:125-130). The first two components exhibit heavy tent ring construction, while the third component demonstrates a lighter form of architecture. Three sequences of occupation, all labeled as Thule/Mackenzie Inuit, occur at Hornaday River No. 15. The first component revealed artifacts very similar to those at Okat and Franklin Bay. The second component exhibits a semisubterranean fall or winter dwelling of Thule/Mackenzie Inuit style. The third component possesses artifacts of Thule style, and tent rings of light, summer construction (1992:130-139). Feature 12 from Hornaday River is considered by Stevenson to be of Thule/Mackenzie Inuit origin. Artifacts recovered from the feature are noted to be contemporaneous with those from Okat, postdating the AD 1600 Kitigazuit site in the Mackenzie River Delta (Stevenson 1992:137). Stevenson estimates that the Amundsen Gulf No. 10 site is of very early Copper Inuit origin. While the bilobate tent rings found at the site may indicated Copper Inuit origins, there is no way to be sure, as no artifacts were recovered. A late Dorset occupation is also possible (Stevenson 1992:140-142). The Amundsen Gulf No. 17 site reflects Thule/Mackenzie Inuit styles in both the artifacts and the architecture, and is determined to be of Thule/Mackenzie Inuit origin (1992:142-154).

The locations of the sites within this study may prove of some importance. All sites, with the exception of Amundsen Gulf No. 10 are located inland along rivers or streams, or near lakes. Of the four inland sites, Amundsen Gulf No. 17 remains the only site designated as a fall occupation, only. Bluenose Lake No. 6 and Hornaday River No. 15 each contain a fall component, indicating multiseasonal use or an occupation as a part of the fall move through the region to the western area of the Mackenzie River Delta.

In terms of seasonal round, very little information for Thule or Copper Inuit groups was recovered from this study. However, the Thule/Mackenzie transition groups probably spent most of the spring, summer and early fall months inland, living off spring-killed caribou and fishing. During the summer months, the diet was supplemented with the addition of birds and small animals. This type of subsistence pattern closely resembles that of the more recent Copper Inuit, whose seasonal round would include some of the following activities. In early fall, an occasional trip inland might be planned to retrieve caches of fall-killed caribou. Late fall and winter months would be spent on the sea ice where groups would engage in breathing-hole sealing. In the late spring, summer and early fall months, the Copper Inuit would move inland from the coast, camping near rivers or lakes to fish and intercept migrating caribou. It is suggested that late fall and winter occupations would then be located primarily near coastal areas while spring, summer and early fall sites concentrate near inland rivers and lakes.

Prior to the development of the Copper Inuit, Thule and Mackenzie Inuit groups inhabited the coastal mainland from Amundsen Gulf west to Darnley Bay. Owing to the late freeze-up of sea ice, concentrations of sea mammals around ice-free waters, and the early break-up of winter sea ice, the area around Darnley Bay provided a good area for wintering. If the Thule/Mackenzie Inuit were following the suggested seasonal round, spending summer and early fall months somewhere inland between the Hornaday River and Bluenose Lake, it is unlikely that late fall and/or winter sites will be found east of the Roscoe River, a point approximately half-way between the Darnley Bay area and Bluenose Lake.

As previously noted, faunal evidence indicates three fall components at the inland sites, a Thule/Mackenzie component and a Copper Inuit component at Bluenose Lake 6 and a Thule/Mackenzie Inuit component at Hornaday River 15. The second and third components at Bluenose lake may be estimated as an early fall occupation prior to the Thule/Mackenzie and Copper Inuit's moving to the coast for winter. The fall component at the Hornaday River site may indicate a brief early fall occupation in which a Thule/Mackenzie group had already begun movement towards the west and coastal area around Darnley Bay.

All sites with spring components are located east of the Roscoe River. This could indicate a movement to the east and south during the spring, and conversely, a return movement westward and northward in the late fall and winter to complete the cycle. From this study, it is difficult to be sure, but the Thule/Mackenzie Inuit groups probably spent the fall and winter months on or near the Mackenzie River.

It is suggested that the basic methods of subsistence pursued by the three cultural groups who inhabited the sites examined changed very little over the course of time. An interesting example is provided by the second occupational component at the Hornaday River 15 site. Stevenson identified this occupation as being Thule/Mackenzie Inuit in origin, but it may well represent a portion of a subsistence pattern demonstrated in more recent Copper Inuit subsistence practices. This occupation could be one of early fall prior to traveling to the coast for winter. If so, this site indicates that subsistence and migration patterns did not change appreciably from the Thule era to the recent Copper Inuit occupations. All sites, with the exception of Amundsen Gulf No 10, whose faunal remains consisted almost entirely of seal remains, exhibited a heavy dependence upon caribou, with various species of fish, birds, and small animals supplementing the diet. This evidence indicates relatively little change in subsistence practices.

The study undertaken here, while not setting out to prove or disprove the validity of Binford's works, tends to support Binford's theories concerning situationally-dependent behavior. Significant differences regarding the treatment of caribou carcasses by three temporally separated cultures were not recognized. It would appear, that in cases where the same types of resources are utilized intensively over long periods of time, and in very similar environmental settings, and with similar technologies, that certain behaviors do not differ greatly.

Based upon the analysis of these faunal assemblages, I do not recognize patterns of cultural distinctiveness in the faunal material as suggested by Woollett (1991). In terms of bone processing, it appears that all of the cultural groups in question at these sites were utilizing animals in much the same ways, providing little evidence for cultural distinctiveness in carcass processing. The same types of limited resources available on a seasonal basis appear to have been exploited by all of the groups existing in this area. As previously mentioned, not all of the bones were available from the faunal assemblages, having been removed for C^{14} testing. This rendered certain types of analysis impossible, and limited the investigations of this study to basic subsistence questions. Perhaps if the complete assemblages had been available, a more detailed investigation could have been conducted, possibly answering specific questions regarding breakage patterns and culturally distinct patterns in processing.

In the same vein that it is suggested that subsistence methods varied little culturally or temporally, it may also be suggested that gender roles also remained very similar in the sites examined. Similar methods of subsistence lent themselves to forming similar gender roles cross-culturally and temporally. Women's contributions to the archaeological record have been previously mentioned. On the basis of the interpretation of "negative" evidence demonstrated in the utility indices, it seems likely that women in all three cultural groups performed many of the same activities. The same types of processing patterns appear in all cases with the exception of Amundsen Gulf No. 10, Amundsen Gulf No. 17, and Feature 12 from Hornaday River No. 15. Amundsen Gulf 10 is not used to support gender conclusions because it lacked an assemblage of caribou remains, the species tested with the utility indices. Amundsen Gulf No. 17 lacks the appearance of the "ravaged" inland assemblages, and Feature 12 of Hornaday River No. 15 is not called upon to support gender conclusions in the archaeology of these sites simply because it functions differently within the site as a hunting blind rather than a domestic area. From these analyses it may be said that the Copper Inuit women as well as the Thule and Mackenzie Inuit women were (a) engaging in secondary decision-making activities, once animals were introduced into the site, and (b) processing animals for meat, marrow, or grease according to the elements selected, and (c) reducing and/or destroying bones which directly affected the formation of the archaeological record. It appears that the general strategies of subsistence did not change appreciably over time, nor did the respective roles of men and women vary little through time, representing a very successful or obligate subsistence strategy.

Appendix

Animals Killed For Meat (by Sex)[a]

	Fall 1969	Spring 1971	Spring 1972	Total
Males	160 (72.1)	80 (76.9)	99 (81.1)	339 (73.7)
Females	62 (27.9)	24 (23.1)	23 (18.9)	109 (26.3)
Total	222	104	122	448

[a] Numbers in parentheses are the percentages of the totals for each season.

Animals Recorded at Kill-Butchering Locations (by Sex)[a]

	Fall	Winter	Spring	Anavik (spring) 1971	Anaktiqtauk (spring) 1972	Summer
Males	89 (71.2)	14 (56.0)	3 (25.0)	41 (77.4)	44 (75.9)	5 (62.5)
Females	36 (28.8)	11 (44.0)	9 (75.0)	12 (22.6)	14 (24.1)	3 (32.5)
Total	125	25	12	53	58	8

[a] Numbers in parentheses are the percentages of the totals for each season.

Tables adapted from Binford (1978:85,86)

These tables serve to illustrate that selection of animals is highly influenced by sex of the animal and the season of the kill.

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